

CUL-403031-18-6007835

The Academy of Management



JOURNAL

Articles

Can Illegal Corporate Behavior Be Predicted? An Event History Analysis

Melissa S. Baucus and Janet P. Near

Testing a Causal Model of Corporate Risk Taking and Performance

Philip Bromiley

Organizational Information Processing, Competitive Responses, and Performance in the U.S. Domestic Airline Industry

Ken G. Smith, Curtis M. Grimm, Martin J. Gannon, and Ming-Jer Chen

Effects of Compensation Strategy on Job Pay Decisions

Caroline L. Weber and Sara L. Rynes

Communication With Employees Following a Merger: A Longitudinal Field Experiment

David M. Schweiger and Angelo S. DeNisi

Gender and Organizational Performance: Determinants of Small Business Survival and Success

Arne L. Kalleberg and Kevin T. Leicht

Adaptive Change in Corporate Control Practices

Jeffrey A. Alexander

18

Research Notes

Behavioral Commitment and Tenure of New Employees:

A Replication and Extension

Cathy J. Kline and Lawrence H. Peters

Effects of Board and Ownership Structure on Corporate R&D Strategy

Barry D. Baysinger, Rita D. Kosnik, and Thomas A. Turk

Prospect Theory and the Risk-Return Relation: Some Belgian Evidence

Marc Jegers

ACADEMY OF MANAGEMENT

BOARD OF GOVERNORS

PRESIDENT	Janice M. Beyer, University of Texas, Austin
PRESIDENT-ELECT & PROFESSIONAL DIVISIONS COORDINATOR	Ramon J. Aldag, University of Wisconsin, Madison
VICE PRESIDENT & PROGRAM CHAIRPERSON	Donald C. Hambrick, Columbia University
SECRETARY-TREASURER & BUSINESS MANAGER	Ken Cooper, Ohio Northern University
PAST PRESIDENT	Steven Kerr, University of Southern California
EDITOR, ACADEMY OF MANAGEMENT EXECUTIVE	John P. Young, University of Colorado, Denver
EDITOR, ACADEMY OF MANAGEMENT JOURNAL	Michael A. Hitt, Texas A&M University
EDITOR, ACADEMY OF MANAGEMENT REVIEW	Richard J. Kilmoski, Ohio State University
REPRESENTATIVES-AT-LARGE	Achilles A. Armenakis, Auburn University
	Richard A. Bettis, Southern Methodist University
	Allen Bluedorn, University of Missouri
	Richard L. Daft, Vanderbilt University
	Janet Fulk, University of Southern California
	Manuel E. London, State University of New York at Stony Brook
	Jeffrey A. Sonnenfeld, Emory University

CHAIRPERSONS OF PROFESSIONAL DIVISIONS

BUSINESS POLICY & PLANNING	Carl P. Zeithaml, University of North Carolina
CAREERS	Joseph Raelin, Boston College
ENTREPRENEURSHIP	Eugene G. Gomolka, University of Dayton
HEALTH CARE ADMINISTRATION	Cynthia Carter Haddock, University of Alabama at Birmingham
INTERNATIONAL MANAGEMENT	John D. Daniels, Indiana University
MANAGEMENT EDUCATION & DEVELOPMENT	Joseph Wolfe, University of Tulsa
MANAGEMENT HISTORY	Gary B. Roberts, Kennesaw State College
MANAGERIAL CONSULTATION	Laurie Larwood, University of Nevada at Reno
ORGANIZATION & MANAGEMENT THEORY	Kim Cameron, University of Michigan
ORGANIZATIONAL BEHAVIOR	Mary Ann Von Glinow, University of Southern California
ORGANIZATIONAL COMMUNICATION & INFORMATION SYSTEMS	William B. Snaveley, Miami University
ORGANIZATIONAL DEVELOPMENT & CHANGE	Robert E. Quinn, University of Michigan
PERSONNEL & HUMAN RESOURCES	Angelo S. DeNisi, Rutgers University
PRODUCTION/OPERATIONS MANAGEMENT	Roger Schroeder, University of Minnesota
PUBLIC SECTOR	John M. Bryson, University of Minnesota
RESEARCH METHODS	Lawrence R. James, University of Tennessee
SOCIAL ISSUES IN MANAGEMENT	Karen Paul, Rochester Institute of Technology
TECHNOLOGY & INNOVATION MANAGEMENT	Richard Goodman, University of California, Los Angeles
WOMEN IN MANAGEMENT	Barbara Gutek, University of Arizona

CHAIRPERSONS OF PROFESSIONAL INTEREST GROUPS

MANAGERIAL & ORGANIZATIONAL COGNITION	William H. Starbuck, New York University
POWER, NEGOTIATION, & CONFLICT MANAGEMENT	Linda L. Putnam, Purdue University

OTHER OPERATIONS

ACADEMY HISTORIAN & ARCHIVIST	Charles D. Wrege, Rutgers University
ACADEMY NEWSLETTER	D. Ray Bagby, Baylor University
ADVERTISING DIRECTOR	Donna Ledgerwood, University of North Texas
DIRECTOR OF COMPUTER SERVICES	Lee G. Caldwell, Novell, Inc.
DIRECTOR OF INTERNATIONAL PROGRAMS	Edwin L. Miller, University of Michigan
DIRECTOR OF MEMBERSHIP	Lucretia Coleman, Georgia College
MEDIA RELATIONS	Barbara Parker, Florida Atlantic University
PLACEMENT	Bruce H. Kemelgor, University of Louisville
PROCEEDINGS EDITORS	Lawrence R. Jauch, Northeast Louisiana University
	Jerry L. Wall, Northeast Louisiana University
PUBLISHER RELATIONS	Carl L. Swanson, University of North Texas
SIGMA IOTA EPSILON, STUDENT DIVISION	B. L. Hodge, Florida State University

05
Academy of Management JOURNAL

658.05
Ac 12

EDITOR
CONSULTING EDITORS

Michael A. Hitt, Texas A&M University
Susan J. Ashford, Dartmouth College
Angelo S. DeNisi, Rutgers University
Jane E. Dutton, University of Michigan
Alan D. Meyer, University of Oregon

EDITORIAL BOARD

Everett E. Adam, Jr., University of Missouri, Columbia
Phillip Anderson, Cornell University
David B. Balkin, University of Colorado
Jean M. Bartunek, Boston College

Thomas S. Bateman, University of North Carolina
Philip Bobko, Rutgers University
Warren Boeker, Columbia University
Philip Bromiley, University of Minnesota
Jennifer A. Chatman, Northwestern University
Edward J. Conlon, University of Iowa
Richard A. D'Aveni, Dartmouth College

Gregory G. Dess, University of Texas, Arlington
Robert Drazin, Emory University

P. Christopher Earley, University of Minnesota

Kathleen M. Eisenhardt, Stanford University

John E. Ettlie, University of Michigan

Gerald R. Ferris, University of Illinois at Urbana-Champaign

Connie J.G. Gersick, University of California at Los Angeles

Ricky W. Griffin, Texas A&M University

Barbara A. Gutek, University of Arizona

Charles W. L. Hill, University of Washington

John R. Hollenbeck, Michigan State University

Robert E. Hoskisson, Texas A&M University

Barbara W. Keats, Arizona State University

Steven J. Kobrin, University of Pennsylvania

Barbara S. Lawrence, University of California at Los Angeles

Thomas W. Lee, University of Washington

Gregory B. Northcraft, University of Arizona

Richard Osborn, Wayne State University

Sara L. Rynes, University of Iowa

Claudia B. Schoonhoven, San Jose State University

Peter Sherer, University of Pennsylvania

Stephen M. Shortell, Northwestern University

Robert Sutton, Stanford University

Anne S. Tsui, University of California at Irvine

James P. Walsh, Dartmouth College

Stuart A. Youngblood, Texas A&M University

BUSINESS MANAGER
ADVERTISING DIRECTOR

COPY EDITOR

INDEX EDITOR

PRODUCTION EDITOR

Ken Cooper, Ohio Northern University

Donna Ledgerwood, University of North Texas

Persephone Doliner, Ithaca, New York

Margaret A. White, Oklahoma State University

Steven Gomes, Buffalo, New York

18

658.05
Ac 12

P 7835

INFORMATION FOR CONTRIBUTORS

The *Academy of Management Journal* publishes articles in fields of interest to members of the Academy of Management. These fields of interest are reflected in the divisions and interest groups listed on the inside front cover of the *Journal*.

AMJ publishes only original, empirical research as articles or research notes. The *Journal* does not publish purely theoretical articles; these are published by the *Academy of Management Review*. Papers that are primarily applied in focus and that have managers as an intended audience should be submitted to the *Academy of Management Executive*.

In its articles, the *Journal* seeks to publish research that develops, tests, or advances management theory and practice. Articles should have a well-articulated and strong theoretical foundation. All types of empirical methods—quantitative, qualitative, or combinations—are acceptable. Exploratory survey research lacking a strong theoretical foundation, methodological studies, replications or extensions of past research, and commentaries with new empirical content are also of interest for publication as research notes if they make an important contribution to knowledge relevant to management.

Articles and research notes should be written so they are understandable and interesting to all members of the Academy. The contributions of specialized research to general management theory and practice should be made evident. Specialized argot and jargon should be translated into terminology in general use within the fields of management. Articles should also be written as concisely as possible without sacrificing meaningfulness or clarity of presentation. To save space, tables should be combined and data should be presented in the text wherever possible.

Manuscripts submitted for publication as articles should not ordinarily exceed 30 double-spaced typewritten pages, including tables. Manuscripts submitted as research notes should not exceed 15 double-spaced typewritten pages, including tables. Everything in submitted manuscripts, including tables, should be typed in double-spaced format on one side of the page. Manuscripts prepared on computers should be printed on letter-quality printers or, if other printers are used, in double-strike or enhanced print.

Manuscripts are considered for publication with the understanding that their contents have not been published and are not under consideration elsewhere. Manuscripts should be prepared in accordance with the *AMJ Style Guide for Authors*, which is published in the March issue and is also available from the editor. Contributors should submit five copies of their papers, retaining the original for their files. The *Journal* does not return manuscripts unless requested to do so.

Decisions regarding publication of submitted manuscripts are based on the recommendation of members of the Editorial Board or other qualified reviewers. All articles and research notes published in the *Journal* are subject to a blind review process. Obvious self-citations that make known the author's identity should be avoided whenever possible. Reviewers evaluate manuscripts on their significance to the field, conceptual adequacy, technical adequacy, appropriateness of content, and clarity of presentation. Reviewers' comments are made available to authors.

Submissions should be sent to Professor Michael A. Hitt, *Academy of Management Journal*, College of Business Administration, Texas A&M University, College Station, Texas 77843-4221.

Academy of Management JOURNAL

CONTENTS

Volume 34, Number 1, March 1991

From the Editor	5
Can Illegal Corporate Behavior Be Predicted? An Event History Analysis Melissa S. Baucus and Janet P. Near	9
Testing a Causal Model of Corporate Risk Taking and Performance Philip Bromiley	37
Organizational Information Processing, Competitive Responses, and Performance in the U.S. Domestic Airline Industry Ken G. Smith, Curtis M. Grimm, Martin J. Gannon, and Ming-Jer Chen	60
Effects of Compensation Strategy on Job Pay Decisions Caroline L. Weber and Sara L. Rynes	86
Communication With Employees Following a Merger: A Longitudinal Field Experiment David M. Schweiger and Angelo S. DeNisi	110
Gender and Organizational Performance: Determinants of Small Business Survival and Success Arne L. Kalleberg and Kevin T. Leicht	136
Adaptive Change in Corporate Control Practices Jeffrey A. Alexander	162

All articles in this issue were accepted during the editorship of Richard T. Mowday.

RESEARCH NOTES

Behavioral Commitment and Tenure of New Employees: A Replication and Extension Cathy J. Kline and Lawrence H. Peters.	194
Effects of Board and Ownership Structure on Corporate R&D Strategy Barry D. Baysinger, Rita D. Kosnik, and Thomas A. Turk	205
Prospect Theory and the Risk-Return Relation: Some Belgian Evidence Marc Jegers	215
Style Guide for Authors	226

The *Academy of Management Journal* (ISSN 0001-4273) is published by the Academy of Management four times a year in March, June, September, and December. The address of the office of publication is Academy of Management, P.O. Box 39, 300 South Union St., Ada, Ohio 45810.

Subscription rates for U.S., Mexico, and Canada: \$38 for one year, \$70 for two years, \$96 for three years. Rates for overseas: \$42 for one year, \$78 for two years, \$108 for three years. All payable in U.S. dollars. Subscriptions and orders for back issues should be sent to the Business Manager, Ken Cooper, P.O. Box 39, 300 South Union St., Ada, Ohio 45810.

Manuscripts and other material of an editorial nature should be sent to Michael A. Hitt, Editor, *Academy of Management Journal*, College of Business Administration, Texas A&M University, College Station, Texas 77843-4221.

Copies of articles published in the *Journal* may be made for instructional, non-commercial use. The Academy of Management does not require prior clearance and makes no charge for this permission.

Inquiries related to advertising should be addressed to Donna Ledgerwood, College of Business Administration, University of North Texas, Denton, Texas 76203.

Typesetting, presswork, binding, and mailing by The Sheridan Press, Hanover, Pennsylvania.

Academy of Management Journal, Publication No. 900920.

Second class postage paid at Ada, Ohio, and additional mailing offices.

POSTMASTER—Send address changes to *Academy of Management Journal*, P.O. Box 39, 300 South Union St., Ada, Ohio 45810.

ISSN, 0001-4273

FROM THE EDITOR

From its inception in 1958, the *Academy of Management Journal* has developed into a highly important and respected journal for the dissemination of scholarly management research. Of course, the stature and reputation for quality enjoyed by *AMJ* is the result of the efforts of many people: past editors, consulting editors, authors, editorial review board members, and ad hoc reviewers. In particular, we owe a debt of gratitude to the efforts of previous editors, each one, who improved the quality and stature of *AMJ*. Thanks to their efforts, *AMJ* is one of the most highly respected management journals. Work published in *AMJ* clearly has helped shape this diverse field we refer to as *management*. Over the years, I have had the benefit of serving as a reader, author, ad hoc reviewer, editorial review board member, and, most recently, consulting editor for *AMJ*. Therefore, I consider it an important honor and significant responsibility to be the editor of *AMJ*.

I am particularly fortunate to follow Richard T. Mowday in the editorship. As those that preceded him, Rick maintained the important stature of *AMJ* with significant contributions to the management field published during his editorship. The *Journal* clearly prospered under his scholarly leadership. Furthermore, I was particularly fortunate to serve as a consulting editor for three years during his term as editor. In this role, I was able to observe how he balanced *AMJ*'s high standards for scholarship with the importance of treating all authors and their work with respect and providing them a thorough hearing. I benefited greatly from his leadership and guidance, and I am proud to call Rick both colleague and friend. Additionally, I am indebted to Rick and his able assistant, Dorothy Wynkoop, for aiding me in every way possible to make my transition to the editorship a smooth one. Rick left *AMJ* in outstanding shape and all of us in the Academy owe him a debt of gratitude for the excellent job he has done as editor.

AMJ has a rich tradition. As a result, I plan no major changes in editorial policy during my term as editor. My role, then, is to continue the tradition, specifically to attract high quality manuscripts, provide thorough reviews and developmental feedback to the authors, and ultimately select and help develop the best manuscripts so that they make strong contributions to the field. Because of its current reputation for high quality and its stature in the field, major improvements will be difficult. However, as our knowledge of management theory and practice grows, and new skills are learned, the research generated and reported also will improve.

I am fortunate to have the able assistance of an outstanding group of colleagues who have agreed to serve *AMJ*. Susan Ashford, Angelo DeNisi, Jane Dutton, and Alan Meyer have agreed to serve as consulting editors. They will assist in the review process and, in particular, help authors develop manuscripts that are under revision. Additionally, a number of quality scholars have agreed to serve on the initial editorial review board. I expect to increase the size of the review board to about 50 members as I gain effective operating knowledge of the needs for expertise in the various man-

agement content areas (based on manuscript flow). As is tradition with *AMJ*, approximately 50 percent of the board will be composed of new members. I am also pleased to announce that Margaret White has agreed to serve as the Index Editor.

Continuity has been aided by the members of the editorial review board, Steve Gomes, Production Editor, and Persephone Doliner, Copy Editor, who have agreed to remain during my term. During the time of my transition to the editorship, I have been impressed with the quality of their efforts and their commitment to excellence. Clearly, their behind-the-scenes efforts have contributed to the quality reputation that *AMJ* now enjoys.

With this issue, you will note a change in the cover design and small changes in the style guide. These changes were made by the Board of Governors, with special efforts on the part of Rick Mowday and Dave Whetten, to provide a unified image to Academy publications. Furthermore, the style guides for *AMJ* and *AMR* have been coordinated and are now essentially the same, except for differences based on their separate missions. The coordination of style guides should facilitate authors' efforts in preparing manuscripts for Academy journals. A copy of the revised style guide is published in this issue.

During my short time as associate editor and now as editor, I have learned of the significant effort required in the startup of the Journal office and operations necessary for efficiency. However, I have been aided greatly by the able assistance of Wanda Bird. She and I worked as a team to establish the necessary policies and procedures for effective operation. I am grateful for all of her efforts and hard work. Also, I wish to recognize the generous support provided by the Management Department at Texas A&M University and by Don Hellriegel, the department head.

In conclusion, I wish to make a few editorial comments. *AMJ* is a publication of the Academy of Management and, thus, serves the needs of the diverse scholarly areas within the Academy and this broad area we call management. Therefore, we invite manuscripts dealing with topics from all of these scholarly areas. However, all manuscripts published in *AMJ* should convey their message to a broad management audience. With that in mind, authors must be sensitive to avoid jargon and highly specialized terminology that would not communicate the contents effectively to this broad audience. Therefore, as a premier management journal, *AMJ* provides an important outlet for authors to showcase their quality research to an interested and large audience.

AMJ has always enjoyed a reputation for thorough and rapid feedback to authors on manuscripts submitted for review. I pledge to continue this important tradition. At the same time, authors are urged not to submit their manuscripts prematurely, before they have undergone appropriate collegial review, development, and maturation. Manuscripts that are submitted in a preliminary stage of development rarely have the opportunity to be published in *AMJ*. Additionally, because they are under developed, it is difficult

to judge their true value, and our audience may be deprived of the opportunity to gain from their potential contributions.

Finally, I am committed to the *AMJ* tradition of a double blind review. There is empirical evidence that blind reviews increase the quality of the reviews and thus of the work that is published. To aid the blind review process, authors should be sensitive to unnecessary self-citation. Undoubtedly, there are times when authors must cite their previous work because it forms the basis for the current research. However, authors should use self-citation judiciously in order to help ensure a blind review process.

In summary, I am committed to continuing the rich *AMJ* tradition of publishing high-quality empirical research in management, thereby effectively serving the membership of the Academy. I solicit your input and comments on the *Journal* and look forward to working with you over the next three years.

Michael A. Hitt

PAST EDITORS

Paul M. Dauten, Jr., <i>University of Illinois</i>	1958–60
Dalton E. McFarland, <i>Michigan State University</i>	1961–63
Paul J. Gordon, <i>Indiana University</i>	1964–66
Stanley C. Vance, <i>University of Oregon</i>	1967–69
William G. Scott, <i>University of Washington</i>	1970–72
John B. Miner, <i>Georgia State University</i>	1973–75
Larry L. Cummings, <i>University of Wisconsin-Madison</i>	1976–78
John W. Slocum, Jr., <i>Southern Methodist University</i>	1979–81
Thomas A. Mahoney, <i>Vanderbilt University</i>	1982–84
Janice M. Beyer, <i>New York University</i>	1985–87
Richard T. Mowday, <i>University of Oregon</i>	1988–90

CAN ILLEGAL CORPORATE BEHAVIOR BE PREDICTED? AN EVENT HISTORY ANALYSIS

MELISSA S. BAUCUS
University of Kentucky

JANET P. NEAR
Indiana University

A model of illegal corporate behavior was developed and tested for a 19-year period using event history analysis and data on clearly illegal acts. Results indicated that large firms operating in dynamic, munificent environments were the most likely of the firms studied to behave illegally, and firms with poor performance were not prone to commit wrongdoing. Membership in certain industries and a history of prior violations also increased the likelihood that a firm would behave illegally.

Recently, research on corporate wrongdoing has shifted from a case study approach in which a few firms in a single industry are studied to investigations comparing a large number of firms in fairly diverse industries (Clinard, Yeager, Brissette, Petrashek, & Harries, 1979; Cochran & Nigh, 1987; Dalton & Kesner, 1987; Kesner, Victor, & Lamont, 1986; Simpson, 1986; Szwajkowski, 1981, 1985). Despite increased attention to illegal corporate behavior, numerous challenges confront researchers investigating corporate illegality. This study contributes to research in that area by attempting to address some key issues.

First, few comprehensive theories of corporate illegality have been developed,¹ so it has been difficult for researchers to identify conditions that lead to illegal activities or to specify relationships among antecedent conditions. To address this problem, we integrated theoretical contributions from a number of disciplines into a model of illegal corporate behavior and then used data on violations by *Fortune* 500 firms to empirically test hypothesized relationships between antecedent conditions and illegal corporate behavior.

Additionally, a common assumption in the literature on corporate illegality has been that different antecedents result in different types of illegal acts—for instance, that environmental scarcity might predict antitrust violations but not employment discrimination. To test this assumption, we

The authors wish to thank Dan Dalton, Terry Dworkin, Herbert Smith, Maury Tamarkin, Keith Provan, and several anonymous reviewers for their helpful comments and suggestions.

¹ Exceptions include Finney and Lesieur (1982) and Szwajkowski (1985).

empirically developed models for each type of illegal activity to determine if the same pattern of antecedents precedes different types of illegal behavior.

Third, although there has been a call for longitudinal research on these issues (Clinard & Yeager, 1980), researchers have conducted only a few longitudinal studies (Baucus, 1987; Simpson, 1986). Instead, researchers have used five-year averages or trends when predicting illegal behavior (Clinard et al., 1979) in an effort to incorporate changes in antecedent conditions; however, some information is lost through this approach. In some cases, researchers have examined antecedent conditions existing before the announcement of legal action against a firm or the resolution of a case rather than before the actual occurrence of the illegal behavior. In this study, we used event history analysis to conduct a longitudinal investigation of the relationships between the hypothesized antecedent conditions and the actual occurrence of illegal behavior.

Finally, this study provides a conservative test of relationships between antecedent conditions and corporate illegality. Rather than study activities that were merely questionable or unethical but not necessarily illegal, we selected cases in which managers knew or should have known that the firm was committing an illegal act. An example may help to illustrate this distinction.

Recently, a federal court judge found Allegheny Bottling, a Pepsi-Cola bottling franchise, guilty of price fixing. The firm had ended years of cola wars by setting prices with its major competitor, Mid-Atlantic Coca-Cola Bottling (*New York Times*, 1988). Since evidence showed most executives in the firm knew of the illegal price-fixing scheme, the court not only fined Allegheny \$1 million but also sentenced it to three years in prison—a sentence that was suspended since a firm cannot be imprisoned. However, the unusual penalty allowed the judge to place the firm on probation and significantly restrict its operations.

In another case, Harris Corporation pleaded no contest to charges that it participated in a kickback scheme involving a defense department loan to the Philippines (*Wall Street Journal*, 1989). Although this plea cost the firm \$500,000 in fines and civil claims, Harris's chief executive said the firm and its employees were not guilty of criminal conduct; he maintained that top managers pleaded no contest because the costs associated with litigation would have been greater than the fines, and litigation would have diverted management attention from firm operations.

Although both cases appear to be instances of illegal corporate behavior, there is an important distinction between them. In the first case, Allegheny's executives knew or should have known the firm's activities were illegal; price fixing is a clear violation of antitrust law. Further, the courts ruled that evidence indicated the firm had engaged in the illegal act. In contrast, it is not clear that Harris Corporation's managers committed an illegal act. Some areas of the law are very ambiguous, including the area relevant to this case, the Foreign Corrupt Practices Act, and managers may not at times know what

Simon, 1958), including engaging in illegal activities when they experience difficulty acquiring the resources necessary for survival (Staw & Szwejkowski, 1975). Thus,

Hypothesis 1: Firms operating in an environment with scarce resources will be more likely to commit violations than firms in munificent environments.

Dynamism. Firms rely on a number of mechanisms to cope with or control dynamic, turbulent (Emery & Trist, 1965), or rapidly changing environmental conditions; illegal behavior may result from those efforts (Finney & Lesieur, 1982; Gross, 1978). For instance, firms facing change may differentiate their structures, adding specialized divisions or departments. The resulting specialists deal with only one segment of the changing environment. Thus, responsibility for overall decision making and segments of key decisions are spread across a number of individuals, and no one individual has sufficient authority or information to prevent or stop illegal activities.

Firms try to reduce environmental uncertainty so that they can use standard operating procedures (SOPs) to deal with routine situations. Dynamic environments make doing so difficult, increasing the likelihood that a firm will behave illegally while applying faulty SOPs or operating without SOPs (Kriesberg, 1976).

The case of *FTC v. Consolidated Foods Corporation*, 396 FS 1344 (1974) illustrates how dynamism may result in illegal behavior. Conso Products, a division of Consolidated Foods, was charged with price discrimination (charging different prices to different retail buyers) and signed a consent order agreeing to change its pricing policies. In 1974, the firm was charged with violating the consent order by continuing to maintain its discriminatory pricing despite warnings from the Federal Trade Commission (FTC). Conso's management argued unsuccessfully that changing competitive conditions, particularly the entrance of new competitors into its markets and increased pressure from existing competitors, prevented the firm from altering its policies. In this case, illegal behavior appears to have resulted mainly from managers' efforts to cope with a dynamic environment.

Hypothesis 2: Firms operating in a dynamic environment will be more likely to commit violations than firms in a stable environment.

Heterogeneity. This aspect of complexity (Aldrich, 1979; Dess & Beard, 1984) refers to the degrees of similarity and diversity of the organizations and individuals in a firm's environment; high uncertainty and competitiveness are associated with a heterogeneous, or diverse, environment. Firms attempt to reduce uncertainty and competition in their environment because they can deal more effectively with a stable environment than an unstable one—for example, standard operating procedures can be developed in stable environments (Aldrich, 1979; Pfeffer & Salancik, 1978). When heterogeneity is high, a firm has to deal with many, diverse organizations in its environment (multiple suppliers, regulatory agencies, and so forth) and the

uncertainty they engender. Thus, it is more likely to engage in illegal behavior than it would be in a homogeneous environment.

Hypothesis 3: Firms operating in a heterogeneous environment will be more likely to commit violations than firms in a homogeneous environment.

Internal Antecedents

Poor performance. Since the primary goal assumed to be guiding corporations is profitability, poor or declining financial performance has been one of the most frequently posited antecedents of corporate illegality (Clinard & Yeager, 1980; Finney & Lesieur, 1982; Gross, 1978). Poor performance pressures firms to find alternative sources of resources or to cut costs in ways that may not be legal (Clinard et al., 1979; Cochran & Nigh, 1987).

Hypothesis 4: Firms with poor financial performance will be more likely to commit violations than firms that are performing well.

Large organization size. Increases in size, the structuring of activities, and decentralization tend to occur in combination in organizations (Pugh et al., 1963; Pugh, Hickson, Hinings, & Turner, 1968). Communication and coordination problems and increased uncertainty within a firm result, possibly leading to illegal behavior as managers attempt to cope with the situation.

As a firm increases in size, it creates specialized units to deal with subsets of activities and decentralizes decision making, empowering the specialized units; this decentralization creates more units in which wrongdoing can occur and increases opportunities for illegal behavior (Vaughan, 1982). Personal and structural controls decrease as a firm grows, resulting in violations (Finney & Lesieur, 1982); more employees are available to commit illegal acts, probably without corresponding increases in the control of their behavior. Knowledge of illegal activities may not spread beyond the unit or units involved.

Although earlier research has not shown a relationship between size and illegal behavior (Clinard et al., 1979; Lane, 1953–54), results of recent studies have shown a positive relationship between the two (Cochran & Nigh, 1987; Dalton & Kesner, 1987). Differences between the earlier and later studies may account for their conflicting results. Lane investigated a small sample of firms in one industry in the Northeast, and the other researchers cited relied on large samples of firms in the *Fortune* 500 or firms for which Standard and Poor's COMPUSTAT data were available; thus, Lane's results may be unique to firms in that study. Cochran and Nigh reanalyzed the data collected by Clinard, comparing the sizes of violating and nonviolating firms; they noted that the positive relationship between size and illegal behavior observed in their study was consistent with results Clinard and colleagues obtained in an analysis of nonminor violations. Therefore, we propose:

Hypothesis 5: Large firms will be more likely to commit violations than small firms.

Low organizational slack. Organizational slack is the excess that remains once a firm has paid its various internal and external constituencies to maintain their cooperation. Cyert and March wrote that slack "plays both a stabilizing and adaptive role" (1963: 38). Firms with slack resources have more alternatives to illegal behavior than firms without slack; the former are, for instance, less likely to be dependent on a single product and more able to engage in R&D efforts to develop alternatives. Slack resources also reduce the need for communication and coordination in a firm (Galbraith, 1973) and facilitate managing demands from the external environment (Pfeffer & Salancik, 1978). In contrast, a lack of organizational slack will lead to efforts to find additional resources or cut costs. Firms with poor material capacity (little slack) have fewer strategic choices available than firms with a strong capacity (Chakravarthy, 1982); thus, illegal behavior may occur as managers attempt to cope with limited options and high uncertainty.

Hypothesis 6: Firms with low levels of slack resources will be more likely to commit violations than firms with high levels of slack resources.

Although interactions among the environmental and internal variables in this study seemed possible, there was no theoretical basis in the literature on illegal corporate behavior for hypothesizing certain combinations of variables over other combinations.

Situational Antecedents

Prior violations. A history of prior violations of the law can indicate that a firm engages in a pattern of wrongdoing. Firms may become committed to illegal activities (Finney & Lesieur, 1982), resulting in repeated violations. Development of a corporate culture, or behavioral norms, in a firm that encourages wrongdoing may also cause corporate illegality (Clinard & Yeager, 1980), resulting in a pattern of violations.

Hypothesis 7: Firms with a history of violating the law will be more likely to commit violations than firms without prior convictions.

Industry. Additionally, the industry in which a firm operates may be related to the extent to which it engages in illegal behavior for at least two reasons: illegal behavior is more frequent in some industries than in others, and surveillance and legal enforcement is more strict in some industries than in others. If an industry culture, the behavioral norms firms in an industry share, results in illegal behavior (Clinard & Yeager, 1980), firms in certain industries may be more likely to engage in wrongdoing than firms in other industries. In fact, the reported incidence of illegal behavior differs across industries (Simpson, 1986), and violation rates are similar for firms in given industries (Cressey, 1976). Although we expected industry to be a

strong predictor of corporate illegality, there was no theoretical basis for predicting which industries would be more likely to engage in illegal behavior.

Type of violation. The relationships shown in Figure 1 are based on the assumption that certain antecedents lead to illegal behavior in general; however, it is possible that a particular type of violation may depend on particular antecedent conditions—one combination of antecedents may result in discrimination, another in product liability problems. Although the results of previous research have suggested that different antecedent conditions lead to different violations (Clinard et al., 1979; Szwajkowski, 1981), it is still unclear which combination of antecedents leads to each type of illegal activity. We conducted separate analyses to test whether the relationships predicted in Figure 1 varied according to the type of illegal behavior under consideration.

METHODS

Data

As was noted, previous studies have investigated wrongdoing in general, but we studied only cases of clearly illegal behavior because the antecedents of clearly illegal and more ambiguous violations may differ. Restricting the study to firms on the *Fortune* 500 list, the same basic population used in earlier research (Clinard et al., 1979; Cochran & Nigh, 1987; Dalton & Kesner, 1987), we gathered data on convicted and nonconvicted firms on the list for at least two nonconsecutive years during the period 1974–83. As Table 1 shows, the companies studied represented diverse industries as defined by two-digit Standard Industrial Classification (SIC) codes. In only a few cases (SIC codes 24, 35, and 37, for example) was there much disparity between the number of convicted and nonconvicted firms in a particular industry group.

A search for all *Fortune* 500 firms convicted by the courts during the period 1974–83 produced 141 violations committed by 88 firms, with some firms having committed multiple violations. All violations involved acts that decision makers knew or should have known were illegal. For convicted firms, we used the four-digit SIC code representing the industry in which the illegal behavior occurred to examine environmental factors; the firm's primary industry was used in ten cases in which information on the industry involved was unavailable.

Once we eliminated convicted firms from the *Fortune* list, we randomly selected a sample of 104 nonconvicted firms and gathered data on their primary four-digit industries. Additionally, since convicted firms committed violations in primary and secondary industries, it was necessary to gather data on both the primary and secondary industries of nonconvicted firms to make comparisons. In order to do this, we randomly selected 42 of the 104 firms already in the nonconvicted group and gathered data on a randomly selected secondary industry for those firms.

is legal or illegal; thus, a firm may inadvertently engage in behavior that is later defined as illegal. No contest pleas, paying fines, and so forth do not establish a firm's guilt. As the Harris case illustrates, executives may agree to such resolutions to avoid the costs and time involved in a legal battle.

Previously, researchers investigating corporate illegality have relied primarily on cases similar to the Harris case: regulatory violations in which a firm paid a fine, pleaded *nolo contendere*, or signed a consent decree (Cline et al., 1979; Cochran & Nigh, 1987; Szwajkowski, 1981). In these cases, illegal behavior may not have occurred, and the activities studied may be more accurately described as dubious behavior (Bromiley & Marcus, 1989) or organizational misconduct (Szwajkowski, 1986). Since the antecedents of illegal behavior and more general types of organizational misconduct like unethical or questionable behavior may differ, we restricted the present study to corporate acts that were clearly illegal. We investigated only cases in which a firm's agents—managers or employees with authority to take action—knowingly engaged in illegal acts. These were violations in which the law assumed a firm acted with knowledge or intent and the courts ruled that the firm was guilty of illegal behavior. Our goal was to investigate corporate illegal behavior rather than corporate wrongdoing.

Four types of activities met the criteria for clearly illegal behavior: (1) certain discrimination violations, (2) certain antitrust violations, (3) product liability violations with punitive damages, and (4) other violations, such as violating a consent decree, willful patent infringement, and so forth. We explain each type of violation in more detail in a later section.

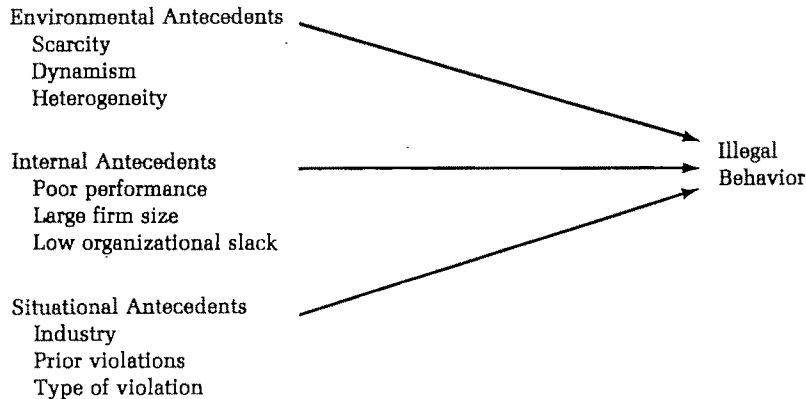
The present study contributes to knowledge of illegal corporate behavior by proposing and testing a model of illegal corporate behavior using longitudinal data on environmental, internal, and situational antecedents and clearly illegal corporate activities. Further, by creating separate models for each type or category of illegal behavior, we addressed the issue of whether antecedents vary for each type of illegal behavior.

ANTECEDENT CONDITIONS

Figure 1 depicts the three classes of antecedent variables examined in our model: environmental, internal, and situational variables. The first three variables, scarcity, dynamism, and heterogeneity, describe conditions associated with a firm's environment and are derived from Aldrich's (1979) formulation of key environmental dimensions. The three internal variables, which represent individual characteristics of firms themselves, are analogous to the personality variables used when individuals are studied; in this model, we posited poor performance, large size, and low slack as firm-level variables that lead to illegal behavior.

Situational variables represent conditions with both internal and environmental elements, but these variables are related directly to a specific instance of illegality. A history of prior violations is a characteristic of a firm itself, but the firm's environment influences that characteristic because reg-

FIGURE 1
Proposed Model of the Illegal Corporate Behavior Process



ulating agencies monitor various firms' activities differently, depending on their location, industry, and visibility. Industry membership is also an internal characteristic, however, because the managers of a firm choose its niche. In this study, the importance of industry membership is not a matter of an industry's technology but rather of its environmental responses and regulating agencies' responses to that industry. Some industries are more likely than others to have members that engage in wrongdoing, perhaps because of history or structure; and illegality is more likely to be observed in some industries than in others because law enforcement or regulatory agencies are more exacting in the case of the former. Thus, prior violations and industry are antecedent variables that are related clearly to neither environment nor firm, in this particular case; instead, they are short-term characteristics of the particular situation in which a firm finds itself. Finally, the type of illegality in which a firm engages is also a situational variable because it represents a characteristic of a specific situation.

Environmental Antecedents

Theories of environment have focused on identifying a list, or comprehensive set, of independent or uncorrelated characteristics, following Aldrich's (1979) formulation. We considered all these characteristics important because they create conditions that result in managerial actions—some illegal—representing efforts to cope with or alter these conditions.

Scarcity. Previous research has frequently hypothesized that environmental scarcity affects organizational behavior (March & Simon, 1958; Pfeffer & Salancik, 1978; Staw & Szewajkowski, 1975). An environment with scarce resources increases the uncertainty facing a firm (Pfeffer & Salancik, 1978), and managers will take action to reduce that uncertainty (March &

TABLE 1
Convicted and Nonconvicted Firms by Industry Classification

Two-Digit SIC Code ^a	Number of Convicted Firms					Number of Nonconvicted Firms
	Product Liability	Anti- trust	Discrim- ination	Other	Total	
12 Mining	0	0	0	1	1	0
13 Oil-Gas Extraction	0	0	0	1	1	2
16 Construction	0	0	0	0	0	1
20 Food	0	7	4	4	15	12
21 Tobacco	0	0	1	0	1	3
22 Textile mill products	0	0	2	0	2	10
23 Apparel, textile products	1	0	0	1	2	5
24 Lumber-wood products	3	3	2	3	11	1
25 Furniture-fixtures	0	0	0	0	0	1
26 Paper products	0	1	4	0	5	5
27 Publishing-printing	0	1	0	0	1	7
28 Chemicals	2	1	12	0	15	21
29 Petroleum refining	0	7	1	4	12	3
30 Rubber, plastics	1	1	1	1	4	2
32 Stone, glass, and clay products	2	2	2	0	6	4
33 Metal manufacturing	0	0	12	0	12	6
34 Fabricated metal products	0	0	3	0	3	11
35 Machinery	1	1	2	1	5	19
36 Electronics	0	1	6	0	7	9
37 Transportation equipment	5	0	13	5	23	7
38 Instruments and related products	1	1	0	1	3	4
39 Miscellaneous manufacturing	0	0	0	0	0	3
40 Railroad transportation	0	0	1	1	2	0
41 Local passenger transit	0	0	0	2	2	0
44 Water transportation	0	0	0	0	0	1
48 Communications	0	0	0	0	0	1
49 Electric, gas, sanitary services	0	0	0	0	0	1
51 Wholesale trade	0	0	0	1	1	3
61 Credit agencies	0	0	0	0	0	1
63 Insurance carriers	0	0	0	0	0	1
67 Holding-investment companies	0	0	0	0	0	1
73 Business services	0	1	0	0	1	0
78 Motion pictures	0	0	0	0	0	1
Total	16	27	66	26	135	146

^a We classified convicted firms according to the two-digit industry in which a violation occurred; nonconvicted firms are classified by their primary industry, and 42 of them are also classified by a randomly selected secondary industry.

Measures

Illegal behavior. We initially used Westlaw, a data base of legal cases, and then drew on loose-leaf legal services such as the *Products Liability Reporter* to compile complete data on convictions. We compiled a history of all decisions in every case to insure exclusion of cases with overturned decisions.

Although cases were selected by identifying convictions made during a ten-year period (1974–83), the illegal behavior itself occurred over a 19-year period (1963–81). Laws changed during that period, so we considered each case in the context of what was illegal at the time the act was committed. A dichotomous variable represented whether each firm committed illegal behavior in each of the 19 years (0 = no illegal behavior, 1 = illegal behavior). Since illegal behavior often occurred over a period of time and the exact date when it began was usually not available, we used the last year in which the behavior occurred; our assumption was that the antecedent conditions that initiated illegal behavior continued to exist, and thus illegal activities continued, throughout the period.

Four categories of illegal behavior were included in the data. Discrimination violations (49 percent of the data) consisted of the two types of discrimination covered by Title VII of the 1964 Civil Rights Act: (1) disparate treatment, or intentional discrimination, which refers to companies' treating certain individuals or groups differently from others in hiring, promoting, and so forth on the basis of their membership in a protected class covered by Title VII, and (2) disparate impact, or unintentional (but still illegal) discrimination, which refers to use of neutral rules or policies that have an adverse impact on protected groups (*Jones v. Lee Way Motor Freight*, 431 F.2d 245, 1970; *Quarles v. Phillip Morris, Inc.*, 279 FS 505, 1968). We used disparate impact cases only when illegal behavior occurred after landmark cases had defined disparate impact as clearly illegal. Since these cases were widely publicized and established precedents, managers should have known what acts were considered illegal; whether or not a given manager knew is not the issue, but merely that the law fairly clearly defined illegal activities, and managers were expected to know and abide by the law.

A second category was per se antitrust cases (20 percent of the data), acts involving horizontal or vertical price fixing, horizontal division of customers or territories, bid rigging, most tying arrangements,² and certain types of group boycotts. Courts have determined that there is no legitimate business reason to engage in such activities except to restrain trade (*White Motor Co.*

² A tying arrangement refers to a situation in which the purchase of one product (tying product) is conditioned on the purchase of another (tied product). For virtually all of the period of this study, tying arrangements were considered illegal per se under antitrust law (*Digidyne Corporation v. Data General Corporation*, 734 F.2d 1336, 1984); however, in recent years the courts have softened this approach, for example, allowing tying arrangements when they are part of a franchise agreement (*Principe v. McDonald's Corporation*, 631 F.2d 303, 1980) or a comprehensive system of doing business.

v. *United States*, 372 U.S. 253, 1963) and that "it is not necessary to consider why the acts were committed or what effect it had on the industry" (*U.S. v. Koppers Company, Inc.*, 652 F.2d 290, 1981). We did not use rule of reason violations, which involve activities such as mergers, acquisitions, and vertical division of customers or territories and in which the courts examine the facts peculiar to each case to determine if an act was reasonable or not; in those cases, managers may not have known an act was illegal until it was defined as such after the fact.

The third category of illegality studied was product liability cases involving punitive damages (12 percent of the data). These cases are distinct from most product liability cases because they involve situations in which a manufacturer has either knowingly, intentionally, recklessly, or maliciously disregarded consumers' or users' safety or has had knowledge of or information about product defects but failed to act on it.

The final category (19 percent of the data) consisted of other violations, acts that were not as frequent as the others but were clearly illegal. Violating a consent decree is an example of such a violation, since the courts must prove beyond a reasonable doubt that a firm willfully disobeyed an initial court order. Intentional securities fraud, willful or intentional patent infringement, and cases other than product liability with punitive damage awards were other types of activities included in this category.

Six violations falling in the above categories were omitted from the analysis: one that occurred before the start of the study and five that occurred in the same year and the same industry as another, more serious, violation by the same firm. We could not easily incorporate such violations into the study since the unit of analysis was each firm in a particular industry in a given year. More important, the analytical technique used in this study, event history analysis, predicts the occurrence of one or more violations by a firm in a given year, so elimination of simultaneous events—two or more events occurring in one unit of time—does not affect results (Allison, 1982), which show the probability of a firm engaging in one or more violations given particular antecedent conditions.

Each violation in the study represented a separate illegal act rather than multiple lawsuits based on one illegal act. Two-thirds of the firms with multiple convictions (18 out of 27 firms) committed the crimes in different industries or committed two or more different types of violations. Also, firms with multiple violations engaged in the illegal acts at different times, and different individuals (at different plants or divisions of a firm) were typically involved in the commission of each violation. For these reasons, we assumed that multiple violations by a single firm represented fairly independent observations. As Table 2 shows, illegal acts of each type were fairly evenly distributed over time, with the exception of discrimination violations, which peaked in 1974.

Environmental antecedents. These variables were not highly intercorrelated, as the coefficients in Table 3 show.

Taking Aldrich's (1979) capacity variable as a model, we used industry

TABLE 2
Chronological Distribution of Illegal Behavior^a

Year	All Violations	Product Liability	Antitrust	Discrimination	Other
1964	1	1	0	0	0
1965	2	0	1	1	0
1966	2	0	0	1	1
1967	0	0	0	0	0
1968	5	0	3	2	0
1969	10	2	1	3	4
1970	6	1	0	2	3
1971	13	1	5	6	1
1972	11	0	5	5	1
1973	17	1	5	6	5
1974	20	1	2	16	1
1975	11	1	2	7	1
1976	10	1	1	5	3
1977	9	2	1	3	3
1978	9	3	1	5	0
1979	3	0	0	3	0
1980	3	2	0	1	0
1981	3	0	0	0	3
Total	135	16	27	66	26

^a The year shown is the year illegal behavior occurred rather than the year a firm was convicted for the activity.

growth rate—or the change in value added (the difference between purchases of raw materials, fuel, and so forth and sales) in an industry from one year to the next adjusted for inflation—to measure munificence. Simpson (1986) used growth in value added as an indicator of scarcity or munificence, and appropriate data were available in the *Annual Survey of Manufactures*. An environment with scarce resources will exhibit little or no growth in value added since firms will attempt to operate as efficiently as possible. Although an individual firm can engage in outsourcing (buying component parts rather than making them) and affect its own growth in value added, its action is not likely to affect the growth in value added of the industry as a whole significantly.

The concept of dynamism incorporates characteristics of Aldrich's (1979) stability-instability and turbulence constructs. Dynamism involves both the degree of turnover characteristic of an industry and the interconnections among elements and organizations in a firm's environment. We measured dynamism in a way that resembled Dess and Beard's (1984) measure, using the variance in the value of shipments in an industry over the 19-year period adjusted for inflation; data were obtained from the *Annual Survey of Manufactures*. We considered the value of shipments in an industry a measure of both turnover and firms' interconnectedness because it reflects demand for the industry's products. This figure includes the value of

TABLE 3
Means, Standard Deviations, and Correlations for All Variables for 1978^a

Variables ^b	Means	s.d.	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Performance	0.07	0.03													
2. Size	45.48	75.80	-.08												
3. Slack	0.26	0.43	.41**	-.20**											
4. Munificence	0.03	0.10	.12*	.01	-.03										
5. Dynamism	1,845.88	4,199.09	-.10	.10	-.12*	-.28**									
6. Heterogeneity	12.02	11.05	-.15**	.17**	-.10	.05	-.16**								
7. Violation	0.04	0.19	.02	.04	.03	.04	-.07	-.06							
8. Product liability	0.01	0.11	.05	-.03	.10	.07	-.04	-.04	.57**						
9. Antitrust	0.00	0.06		.09	-.04	.01	-.02	-.06	.33**	-.01					
10. Discrimination	0.02	0.14	-.03	.03	-.06	.00	-.06	-.02	.74**	-.02	-.01				
11. Other	0.00	0.00													
12. One prior violation	0.40	0.49	-.19**	.25**	-.22**	.09	.22**	.02	.06	.06	.08	.00			
13. Two prior violations	0.16	0.37	-.22**	.42**	-.16**	.02	.04	.10	.09	.05	.14*	.02	.54**		
14. Three or more prior violations	0.05	0.22	-.15*	.61**	-.14**	-.01	.10	.05	.05	-.03	.27**	-.03	.29**	.53**	

^a N ranges from 210 to 255.

^b Performance is in millions of dollars; firm size is in thousands of employees.

* $p < .05$

** $p < .01$

658.05
Ac 12

P 7835

products manufactured by a particular plant but sold or transferred to another plant of the same corporation, so it is likely to be larger than industry sales; however, the variance in value of shipments provides an indication of fluctuations in demand in an industry over time.

Although some firms may have experienced a steady increase in dynamism and others an increase, decrease, and then another increase during the period of this study, we considered both patterns an overall increase in environmental dynamism. Our interest was in determining the relationship between long-term dynamism and illegal corporate behavior. We assumed that short-term fluctuations in dynamism would not elicit much of a response from corporate managers and therefore would not elicit illegal behavior.

Homogeneity and heterogeneity indicate how similar or how different elements or organizations in a firm's environment are (Aldrich, 1979). Previous research has shown that firms in four-digit industries confront homogeneous environments (Davis, Dess, & Beard, 1983); therefore, a good indicator of the degree of heterogeneity facing a firm was the number of different four-digit SIC code industries in which the firm and its divisions competed. We obtained these data from Standard and Poor's Register of Corporations, Directors and Executives.

Internal antecedents. Financial performance was measured by return on investment (ROI), or the net profit after taxes divided by total assets; Standard and Poor's COMPUSTAT data base provided data for computing ROI.

Organizational size was measured as number of employees, information that is available on the COMPUSTAT data base. Previous researchers have developed several measures of size, but its major aspects—sales, assets, and number of employees—are highly intercorrelated (Kimberly, 1976). We chose number of employees because it is the most common measure of size (Hall, 1987), having been used in 80 percent of empirical studies in organization theory (Kimberly, 1976).

To measure organizational slack, or excess resources, we used a financially derived measure Bourgeois (1981) and Bourgeois and Singh (1983) advocated. We relied on Singh's (1986) concept of unabsorbed slack; previous studies have measured unabsorbed slack using quick ratios, which are the sum of cash, short-term marketable securities, and receivables divided by total current liabilities (Cheng & Kesner, 1988; Singh, 1986). Since the level of organizational slack may vary by industry, we measured slack by subtracting an industry's quick ratio from a firm's quick ratio; the difference indicated the excess resources available to the firm relative to other firms in the industry. A three-year moving average was used to smooth short-term variations in firm liquidity. Data for computing firms' quick ratios were available from COMPUSTAT, and industry quick ratios appear in *Robert Morris Associates: Statement Studies*.

Situational antecedents. Prior violations were measured by creating three dichotomous variables representing one, two, and three or more prior violations. For each firm in each year of the study, we coded each of the prior

violations variables as 0 if prior violations had not occurred or if the amount of violations was less than the number represented by the variable (one, two, or three or more), or 1 if the amount of prior violations was equal to or more than the number represented by the variable. Therefore, once a firm committed a violation, the value of the variable representing one prior violation was coded as 1 in the remainder of the years of the study.

To examine the relationship between industry and illegal behavior, we created a set of variables representing industries with the highest incidences of illegal behavior. An examination of the frequency of violations across two-digit industries revealed six industries in which firms had committed ten or more violations. These were the chemicals industry (SIC code 28), the food industry (20), metal manufacturing (33), lumber and wood products (24), petroleum refining (29), and transportation equipment (37). Six dichotomous variables were created, each representing one of these industries; for each firm in each of the 19 years, we coded each variable as 0 if the firm was not operating in that industry and as 1 if it was doing so.

Analysis

Since the dependent variable was dichotomous and measured in each year of the study, we could not use traditional statistical techniques. Event history analysis, a technique similar to multiple regression, provided a way to examine the relationship between the antecedents and the likelihood (the logarithmic odds) of a firm's committing an illegal act. Event history, a special type of log-linear analysis, provides an advantage over standard techniques because it uses more information—in this case, changes in antecedent conditions in each year—in the analysis: it provides a way to include explanatory variables that change over time, or time-varying explanatory variables (Allison, 1984). Thus, we could examine the relationships between the antecedents and illegal behavior in each year of the 19-year period of the study.

Allison (1982, 1984) provides a complete description of event history analysis; the following explanation of the discrete-time methods used in this study comes from those works. First, we treated each year for each firm in a particular industry as a separate observation or unit of analysis, thus creating a set of 4,845 corporation-industry-years (133 corporations with one industry plus 61 firms with two industries times 19 years of data for each corporation-industry). We coded the dependent variable as 1 if the event for which a firm was convicted occurred during that year and as 0 otherwise.

Actual values of the potential antecedents were obtained in each year for the 19 years of the study (1963–81). Given the large number of observations, the large variance in most of the antecedents, and the use of maximum likelihood estimation in event history analysis, computer analysis when the antecedents were continuous variables would have been quite unwieldy. Following Allison's recommendation (1984: 21), we minimized loss of information by transforming the antecedents from continuous to categorical variables using the frequencies: we divided each variable into three catego-

ries and assigned codes of 1, 2, and 3 to values in the lower, middle, and upper thirds of the distribution. All the antecedent variables except environmental dynamism were time-varying explanatory variables. We used stepwise logistic regression in the Biomedical Program (BMDP) statistical package (Dixon, 1983) to model the data.

RESULTS

For purposes of illustration, we provide means, standard deviations, and correlations for all variables for one year, 1978, in Table 3. As the table shows, nine violations occurred in 1978, and none of those were in the other category. Results were comparable in each of the other 18 years examined.

A Test of the General Model of Illegal Corporate Behavior

Environmental and internal antecedents were entered into the model at the same time to test Hypotheses 1 through 6 (model 1 in Table 4). We used effect coding rather than dummy coding for each variable; thus, the coefficient shown represents a comparison of a given level of the variable with the lowest level; for example, a moderate level of resources was compared to very few resources.

For log-linear models, a nonsignificant chi-square indicates a good fit. Thus, the overall goodness-of-fit chi-square for model 1 suggested that the model with all environmental and internal antecedents provided a good fit of the data. The Hosmer chi-square statistic (Hosmer & Lemeshow, 1980), which uses predicted and observed frequencies for ten cells to indicate how well predicted values fit the actual data, provided another measure of fit. This statistic was quite small for model 1, indicating that the fit was not very good in some cells.

Eliminating variables with nonsignificant coefficients in model 1 improved the fit of the model (model 2 in Table 4); both chi-square statistics indicated a good fit. Model 1 was a special case of model 2, so we could compare them by computing the difference between their chi-squares (Allison, 1982), which will have a chi-square distribution and degrees of freedom equal to the difference between each model's degrees of freedom. This computation tests the null hypothesis that models are equal. Since the resulting chi-square was not significant (3.35, 6 df), we considered models 1 and 2 equivalent; since model 1, with its three additional variables, did not provide a better fit than model 2, we preferred model 2, which provided the more parsimonious explanation of the data.³

³ When modeling the data, we excluded cases with data missing on any of the variables. To see whether this exclusion had a substantial effect on the coefficient or parameter estimates, we reestimated models 1 and 2 with the mean substituted for any variable with a missing value. The two resulting models were basically the same as models 1 and 2, indicating that missing data did not bias the estimates greatly. Therefore, we allowed models generated in the subsequent analyses of the antecedents to be without missing data.

TABLE 4
Models Testing the Hypothesized Antecedents of Illegal Corporate Behavior^a

Variables ^b	Model 1		Model 2		Model 3		Model 4	
	β	Standard Error	β	Standard Error	β	Standard Error	β	Standard Error
Munificence 2	-.344*	.16	-.344*	.15	-.230	.14	-.342*	.16
3	.277*	.13	.273*	.13	.255*	.13	.316*	.13
Dynamism 2	-.351*	.16	-.356*	.16	-.215	.15	-.241	.16
3	.415**	.13	.419**	.13	.374**	.13	.167	.15
Heterogeneity 2	-.165	.15						
3	.113	.13						
Size 2	.093	.16	.082	.16	.032	.15	.102	.16
3	.656**	.15	.690**	.14	.498**	.14	.679**	.14
Performance 2	.111	.13						
3	.049	.15						
Slack 2	.086	.14						
3	-.146	.16						
Chemicals								
Food							.212	.18
Metal manufacturing							.403*	.18
Lumber-wood products							.303	.18
Petroleum refining							.606**	.21
Transportation equipment							.582**	.20
One prior violation					.149	.12	.681**	.15
Two prior violations					-.035	.21		
Three or more prior violations					.538	.24		
Constant	-3.799**	.13	-3.775**	.12	-3.104**	.18	1.500**	.54
χ^2	347.99		351.34		91.83		132.69	
df	656		662		76		150	
Significance	1.00		1.00		.10		.84	
Hosmer χ^2	14.77		3.68		7.09		12.11	
df	8		6		8		8	
Significance	.06		.72		.53		.15	
Log-likelihood $\times 2$	-466.88		-468.56		-513.76		-467.17	

^a Model 1 includes all hypothesized antecedents. Model 2 includes all antecedents that were significant in model 1. Model 3 includes antecedents in model 2 and prior violation variables. Model 4 includes antecedents in model 2 and industry variables.

^b Since we used effect coding, a variable followed by a 2 represents a moderate level of that variable compared to a low level of it; those with a 3 represent a high level of the variable compared to a low level of it.

Effects of the Environmental Variables

In writing the following discussion, we converted coefficients from the log-odds shown in Table 4 to percentages, using the formula $100 \times [\exp(b) - 1]$, where b is the coefficient value.

Munificence. In the case of environmental munificence, results indicated that a curvilinear (U-shaped) relationship existed. Specifically, a firm operating in an environment with scarce resources was 41 percent more likely than one operating in an environment with a moderate level of resources to engage in illegal behavior. A firm operating in a munificent environment was 32 percent more likely to behave illegally than a firm operating in an environment with scarce resources.⁴ Thus, there was mixed support for Hypothesis 1: illegal behavior was likely when resources were scarce but was even more probable when resources were very plentiful.

Dynamism. With regard to environmental dynamism, the coefficient for level 2 indicated that a firm operating in an environment with low turbulence was 43 percent more likely to engage in illegal activities than a firm in an environment with a moderate level of turbulence. As predicted, a firm operating in a highly dynamic environment was 51 percent more likely to behave illegally than a firm in an environment with low turbulence. Since the chance of illegality occurring was greatest in a highly dynamic environment, there was some support for Hypothesis 2; however, results suggested that the relationship was curvilinear.

Heterogeneity. There was no support for Hypothesis 3: environmental heterogeneity was not a significant predictor of illegal behavior. However, the results suggested that heterogeneity and illegal behavior might have a curvilinear relationship.

Effects of the Internal Variables

Performance. Coefficients for financial performance were not significant, and the relationship found was opposite that predicted in Hypothesis 4: firms were more likely—though not significantly more likely—to behave illegally when their performance was moderate or very good. Clearly, our hypothesis was not supported.

Size. For organization size, the chances of illegal behavior increased by 10 percent when a firm was moderately large rather than small. Comparing

⁴ The categories being compared were reversed in this case to show that illegal behavior does occur in environments with scarce resources; we used the formula $100 \times [\exp(b) - 1]$ to show the percentage change in the probability of illegal behavior when a firm is in an environment with moderate resources versus an environment with scarce resources (category 2 vs. category 1). Since many studies have shown that illegal behavior is more common in environments with scarce resources than in those with plentiful resources, we used the formula $100 \times [1/(\exp(b) - 1)]$ to show the percentage change in the probability of illegal behavior for firms in environments with scarce resources versus those with moderate resources (category 1 vs. category 2). We took this same approach in interpreting the coefficient for category 2 of environmental dynamism.

very large *Fortune* 500 firms with small ones indicated that the former were almost twice as likely to behave illegally. The strength and significance of this relationship supported the hypothesis that large firms are more likely to engage in illegality; however, there may not be much difference between small and moderate-sized firms.

Slack. There was no support for the hypothesis that firms with little slack are more likely to commit wrongdoing than those with much slack. Coefficients were not significant, and results were opposite those expected: firms with moderate levels of slack were more likely to behave illegally than firms with low levels.

Effects of the Situational Variables

Prior violations. In testing the effects of prior violations, we had no basis for selecting one of the prior violations variables over the others, so we entered all of them into the model at the same time (model 3 in Table 4). Comparing this model with the model of hypothesized antecedents (model 3 vs. model 2) showed that prior violations significantly improved the fit of the data; however, none of the coefficients for the prior violations variables were significant. Results indicated that a firm with three or more prior violations was more likely to behave illegally than a firm with only one (odds of 1.71 vs. 1.16); this result suggested that three or more prior violations might be the best predictor of illegal activity, and a subsequent analysis supported that conclusion.⁵

Industry. When we added industry variables to model 2, results indicated that membership in four of the six industries was a significant predictor of illegal behavior (model 4 in Table 4); however, model 4 did not fit the data significantly better than model 2. A subsequent model using the industry variables that were significant predictors in model 4 and the three-or-more-prior-violations variable did provide a significantly better fit than model 2.⁶

Specifically, firms operating in the foods, lumber, petroleum refining, and transportation equipment (automobile) industries were more likely to

⁵ Space limitations prohibit presenting the results obtained from adding three or more prior violations to model 2 without the other prior violation variables; however, results did indicate that once the variable for three or more prior violations was added, information about one or two prior violations did not significantly improve the ability of the model to predict illegal activity. Further, the coefficient for three or more prior violations was significant when it was the only prior violations variable in the model. Readers interested in the results for this analysis can obtain them from the first author.

⁶ The analysis was conducted using the industry and prior violations variables that were significant predictors of illegal behavior in models 3 and 4. The results (not shown) indicated that most of these variables were significant predictors of illegal behavior: three or more prior violations was highly significant, and memberships in industries two, five, or six was also a significant predictor of illegal activity. Further, the model with the industry and prior violations variables added provided a significantly better fit of the data than model 2. Results of this analysis can be obtained from the first author.

engage in illegal activities than firms in other industries. Although the high likelihood of wrongdoing in the petroleum refining and transportation equipment industries may not surprise most people, it is interesting to note that the chemical industry, whose members are frequently maligned for caring little about issues other than corporate profitability, was not significantly associated with illegal corporate activities.

In general, our results for industry and illegal behavior are consistent with those of previous research (Simpson, 1986), suggesting that industry is an important variable requiring further attention: knowing that a firm operates in a given industry may be a good way to predict the likelihood of that firm's engaging in illegal behavior. An issue demanding further attention is whether certain industry cultures increase the likelihood of illegal activities or if other factors are operating in the industries with high levels of illegality.

Some caution is necessary when investigating industry as a predictor of illegal behavior. Researchers need to consider whether industry differences reflect different rates of prosecution and litigation in some industries or actual differences in illegal behavior.

Type of violation. To test the widely held belief that different antecedents lead to different types of illegality, we generated four separate models; each had a different type of violation as the dependent variable and all the hypothesized antecedents as independent variables. We used event history analysis, so each analysis had a set of 4,845 corporation-industry-years.

Goodness-of-fit chi-square statistics indicated that each model provided a good fit of the data (Table 5). Although only a few coefficients in each model were significant (infrequency of events may affect significance levels and standard errors), the key issue here was whether the same pattern of relationships existed between the antecedents and each type of violation.

In general, results were mixed regarding patterns of antecedents and illegal corporate behavior. On the one hand, for a number of antecedent conditions, the patterns of relationships with each type of wrongdoing were quite similar. A curvilinear relationship existed between environmental munificence and illegal behavior in all cases, indicating that firms were more likely to commit violations when environmental resources were either very scarce or plentiful. Similarly, illegal acts were more likely in either a fairly stable or a very dynamic environment than in other environments; an exception was antitrust violations, which became more likely as the level of dynamism increased. Increases in firm size were also associated with increases in the likelihood of illegality for all but antitrust violations, which were more likely in either small or very large firms than in medium-sized ones. Finally, when a firm had either a low or high level of slack resources, the odds of its engaging in wrongdoing increased; the only exception was committing discrimination violations, which was more likely to occur when there was a moderate level of slack.

Results for the other two antecedent conditions suggested that different patterns of antecedents may precede different illegal activities. When an

TABLE 5
Models Testing the Antecedents of Illegal Corporate Behavior for Types of Violations

Variables ^a	Model 1			Model 2			Model 3			Model 4		
	Antitrust			Product Liability			Discrimination			Other		
	β	Standard Error		β	Standard Error		β	Standard Error		β	Standard Error	
Munificence 2	-.603	.42		-.369	.45		-.292	.21		-.229	.35	
3	.259	.33		.599	.37		.262	.18		.123	.32	
Dynamism 2	.157	.33		-.430	.44		-.506*	.23		-.391	.39	
3	.213	.34		.219	.38		.475**	.18		.649*	.32	
Heterogeneity 2	-.533	.42		.310	.37		-.206	.23		.124	.32	
3	.070	.35		-.659	.44		.442*	.19		-.219	.33	
Size 2	-.559	.43		.438	.39		.447	.29		.057	.35	
3	.612	.35		.364	.41		1.051**	.28		.465	.33	
Performance 2	.077	.36		.109	.38		.236	.18		.020	.35	
3	.567	.35		.407	.38		-.179	.23		-.500	.43	
Slack 2	-.092	.34		-.477	.44		.337	.19		-.125	.34	
3	.141	.35		-.163	.42		-.321	.26		.079	.37	
Constant	-5.730**	.33		-6.009**	.37		-4.982**	.28		-5.590**	.30	
χ^2	107.39			101.55			220.37			112.70		
df	656			656			656			658		
Significance	1.00			1.00			1.00			1.00		
Hosmer χ^2	2.14			0.50			10.04			0.08		
df	2			2			8			1		
Significance	.34			.78			.26			.78		

^a Since we used effect coding, a variable followed by a 2 represents a moderate level of that variable compared to a low level of it; those with a 3 represent a high level of the variable compared to a low level of it.

* $p < .05$

** $p < .01$

environment was either fairly homogeneous or very heterogeneous, the odds of a firm's committing antitrust or discrimination violations increased. But product liability and the types of violations we coded as "other" were more likely to occur when an environment was moderately heterogeneous. Similarly, as firm performance improved, the odds of a firm committing antitrust or product liability violations increased; however, discrimination and other violations were more likely when a firm experienced moderate performance.

In sum, although the general model predicted illegal behavior fairly well for several antecedents, different patterns of relationships emerged as we considered different types of violations. It thus seems that researchers should continue to test for differences in antecedents related to the type of violation under consideration. Further research is needed to develop a theory of corporate illegality to serve as a basis for generating hypotheses by types or subtypes of illegal behavior.

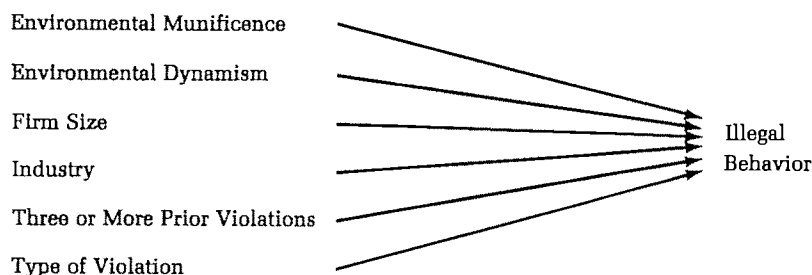
DISCUSSION

Since our goal was to develop and test a model of corporate illegality, we discuss results in terms of the modified model our analyses supported. Limitations of the study and implications of the findings are also considered.

A Modified Model of Illegal Corporate Behavior

According to the modified model (Figure 2), illegal behavior occurs under certain conditions. As predicted, large firms are more likely to commit illegal acts than small firms. Although the probability of such wrongdoing increases when resources are scarce, it is greatest when resources are plentiful. Similarly, illegal behavior is prevalent in fairly stable environments but is more probable in dynamic environments. Membership in certain industries and a history of repeated wrongdoing are also associated with illegal acts. Finally, the type of illegal activity chosen may vary according to the particular combination of environmental and internal conditions under which a firm is operating. This modified model suggests that researchers need to incorporate several alternative explanations into the theoretical work on corporate illegality.

FIGURE 2
Modified Model of the Illegal Corporate Behavior Process



Possible Explanations of Illegal Corporate Behavior

Within the literature on corporate illegality, the predominant view is that pressure and need force managers to behave illegally; however, the curvilinear pattern of findings in this study suggests that this explanation only accounts for illegal acts in some cases. In our data, poor performance and low slack were not associated with illegal behavior, and wrongdoing frequently occurred in munificent environments. Alternative explanations for the relationships revealed in the model include conditions of opportunity and predisposition.

Opportunity. Rather than tightening conditions creating pressure for illegal acts, it may be that loosening, ambiguous conditions create opportunities to behave illegally. In terms of our model, large firm size provided more opportunities to engage in illegal activities than small size; the former condition may make it easy to hide illegal activities. Rules, procedures, and other control mechanisms often lag behind the growth of a firm, providing managers with an opportunity to behave illegally because no internal rules proscribe such behavior.

Illegal behavior may also be an unintended outcome of employees' efforts to operate in an ambiguous situation in which established rules and procedures do not apply and employees must use their own discretion. For example, illegal behavior may be more likely to occur in a dynamic environment in which conditions change quickly and employees may not know what behavior is required or expected. Similarly, in a munificent environment, firms are likely to be pursuing growth or attempting to improve their position; illegal behavior provides a means for acquiring additional resources, or it may be an unintended outcome of managers' efforts to take advantage of a favorable situation.

Predisposition. Sz wajkowski's (1985) concept of choice referred to an individual's predisposition to behave illegally; he implied that something about the individual (intent or some pathological desire) would lead to illegal behavior. Our concept of predisposition differs, indicating a tendency or inclination to select certain activities—illegal ones—over other activities because of socialization or other organizational processes. We avoid the assumption that a firm's managers or agents subscribe to a different set of ethical standards than the rest of society. Instead, we recognize that organizations, and industries, can exert a powerful influence on their members, even those who initially have fairly strong ethical standards.

Our results indicate that firms operating in certain industries tend to behave illegally. Certain industry cultures may predispose managers to select illegal acts. If a firm's major competitors in an industry are performing well, in part as a result of illegal activities, it becomes difficult for managers to choose only legal actions, and they may regard illegal actions as a standard industry practice.

A corporation's culture can also predispose its members to behave illegally. As the relationship between prior violations and illegal behavior ap-

pears to indicate, some firms have a culture that reinforces illegal activity. Some firms are known to selectively recruit and promote employees who have personal values consistent with illegal behavior; firms may also socialize employees to engage in illegal acts as a part of their normal job duties (Conklin, 1977; Geis, 1977). For instance, in his account of cases concerning price fixing for heavy electrical equipment, Geis noted that General Electric removed a manager who refused to discuss prices with a competitor from his job and offered his successor the position with the understanding that management believed he would behave as expected and engage in price-fixing activities (1977: 124).

Pressure, opportunity, and predisposition can all lead to illegal activities; thus, researchers need to posit combinations of variables that create each condition or combination of conditions. We suggest certain combinations on the basis of the results of this study and our review of the literature; however, further research is needed to test these combinations.

Limitations of This Study

Although we tried to obtain the most accurate and complete data available on a stable group of firms, certain limitations should be noted. It may be that some of these are unavoidable.

Generalizability. We examined the effects of resource levels in an industry on the illegal behavior of firms in that industry. Yet firms involved in this and earlier relevant studies were members of the *Fortune* 500—the largest and most profitable firms in the United States, usually conglomerates. We may assume that the various divisions of the firms operated fairly autonomously, but it is not clear to what extent the illegal behavior of one division was related to pressures on another part of the firm or whether such instances occurred with sufficient frequency to confound our results. Future research might be directed toward samples of separate subsidiaries or relatively independent divisions to minimize this problem.

Although we attempted to select convicted and nonconvicted firms from a variety of industries, in several cases only convicted or nonconvicted firms represented an industry; thus, it is possible that differences created by unequal sampling of industry conditions may in part account for our results.

The time period examined also limits our results. Although our data overlapped those presented by earlier researchers, some differences in results could be due to differences in the periods examined. By using a long period (19 years), we attempted to avoid systematic errors of interpretation that might be associated with shorter or more idiosyncratic time frames. In any time period selected, the types of illegal behavior law enforcement agencies scrutinize most carefully will shift.

Finally, we examined for-profit organizations, and our results may not apply to not-for-profit organizations. Research on organizational wrongdoing has tended to ignore differences between private and public organizations, yet clearly such differences need to be investigated if a specific theory of organizational wrongdoing is to be developed.

Measurement. We may have excluded potential predictors of illegal behavior; for example, we did not consider industry concentration and other potentially useful predictors included in grand, or broader, models of corporate illegality (Baucus, 1987; Finney & Lesieur, 1982) because of simple statistical limitations on the number of predictors.

Refinements in some of the measures used here are also needed. A measure for environmental heterogeneity needs to be developed that captures both the number of different industries a firm competes in and the similarity or diversity of those industries. Organizational slack should be broadened to include other dimensions, such as potential and recoverable slack (Bourgeois & Singh, 1983). Refinements of the other environmental dimensions may also prove useful: rather than measuring the pattern of dynamism over time, researchers may be able to obtain data allowing them to assess the frequency, amplitude, and predictability of variations in an environment (Wholey & Brittain, 1989). Such a refinement may provide additional information about the relationships between environmental variations and illegal behavior.

In order to examine the relationships of interest, it was necessary to choose a starting and ending point for the study arbitrarily, creating a problem known as censoring. Illegal acts may have occurred before or after the period of the study, but information on these events was not available. For instance, as Table 2 shows, there were few violations in the period 1964–70, possibly because some violations within this period were resolved prior to 1974, the beginning of the period used to select cases. Although censoring may have affected the reliability of our results, the use of maximum likelihood estimation should minimize any such problems (Tuma & Hannan, 1978; Tuma, Hannan, & Groeneveld, 1979).

Finally, rather than revealing when illegal behavior is likely to occur, the results of our study and of previous studies of corporate illegality may instead reveal conditions under which illegal behavior is detected, prosecuted, and punished. For example, regulatory agencies are likely to monitor firms previously convicted for illegal activities closely. Additionally, regulatory agencies are likely to increase enforcement during certain periods, as when the national political climate favors enforcement; the latter provides another explanation for the infrequency of violations in certain years just noted. At this point, little is known about how regulatory agencies select firms for investigation or prosecution; thus, researchers need to begin to focus on the relationship between enforcement and illegal activities.

Implications

The results of this study have implications for lawmakers and others interested in deterring, predicting, and punishing corporate illegality. For instance, regulatory agencies might make the best use of their limited resources by focusing on very large firms operating in dynamic, munificent environments; since the current process of selecting firms to prosecute for

illegal activities is not random, such a strategy of targeting certain firms should not violate societal standards of fairness or justice.

Further, firms with prior violations were more likely to commit additional illegal acts. Apparently, the current standard of punishment does not deter illegal behavior—quite the opposite, it appears that committing illegal acts may teach firms how to further violate the law. Of course, we must view this finding as tentative, subject to replication, but it is still unsettling. One interpretation is that our findings support what a suspicious, antibusiness subgroup of the American population has always believed to be the case, that big business will “do whatever it can get away with,” violating the law not to cope with environmental pressure but rather to take advantage of opportunities. In any case, the present results add strength to the argument that business is not capable of policing itself but rather is in need of substantial external supervision.

In the literature on corporate social responsibility, researchers have maintained that business can avoid further regulation and help offset the accompanying negative attitudes toward business by demonstrating responsible behavior. Thus, managers operating in firms with these characteristics need to be aware of the high probability of prosecution for illegal activities and may want to explore ways of avoiding or eliminating wrongdoing. The alternative may well be additional policing of their activities, a possibility unlikely to appeal to most managers.

Empirical evidence from this and previous studies clearly indicates that relationships between antecedent conditions and illegal corporate behavior are more complex than previous theories have assumed. Researchers' efforts need to be directed toward incorporating additional factors, such as prior violations, into theories and developing theoretical arguments that specify relationships among antecedent conditions. The complexity of the relationships under investigation demands that researchers use sophisticated analytical techniques; event history analysis is one viable alternative.

REFERENCES

- Aldrich, H. E. 1979. *Organizations and environments*. Englewood Cliffs, NJ: Prentice-Hall.
- Allison, P. D. 1982. Discrete-time methods for the analysis of event histories. In S. Leinhardt (Ed.), *Sociological methodology*: 61–98. San Francisco: Jossey-Bass.
- Allison, P. D. 1984. *Event history analysis: Regression for longitudinal event data*. Beverly Hills, CA: Sage Publications.
- Baucus, M. S. 1987. *Antecedents and consequences of illegal corporate behavior*. Unpublished doctoral dissertation, Indiana University.
- Bourgeois, L. J. III. 1981. On the measurement of organizational slack. *Academy of Management Review*, 6: 29–39.
- Bourgeois, L. J. III, & Singh, J. V. 1983. Organizational slack and political behavior among top management teams. *Academy of Management Proceedings*: 43–47.
- Bromiley, P., & Marcus, A. 1989. The deterrent to dubious corporate behavior: Profitability, probability and safety recalls. *Strategic Management Journal*, 10: 233–250.

- Chakravorthy, B. S. 1982. Adaptation: A promising metaphor for strategic management. *Academy of Management Review*, 7: 35–44.
- Cheng, J. L. C., & Kesner, I. F. 1988. Responsiveness to environmental change: The interactive effects of organizational slack and strategic orientation. *Academy of Management Best Paper Proceedings*: 165–169.
- Clinard, M. B., & Yeager, P. C. 1980. *Corporate crime*. New York: Free Press.
- Clinard, M. B., Yeager, P. C., Brissette, J., Petrashek, D., & Harries, E. 1979. *Illegal corporate behavior*. Washington, DC: U.S. Department of Justice, National Institute of Law Enforcement and Criminal Justice.
- Cochran, P. L., & Nigh, D. 1987. Illegal corporate behavior and the question of moral agency: An empirical examination. In W. C. Frederick (Ed.), *Research in corporate social performance and policy*, vol. 9: 73–91. Greenwich, CT: JAI Press.
- Conklin, J. 1977. *Illegal but not criminal*. Englewood Cliffs, NJ: Prentice-Hall.
- Cressey, D. R. 1976. Restraint of trade, recidivism and delinquent neighborhoods. In J. F. Short (Ed.), *Delinquency, crime and society*: 209–238. Chicago: University of Chicago Press.
- Cyert, R., & March, J. 1963. *A behavioral theory of the firm*. Englewood Cliffs, NJ: Prentice-Hall.
- Dalton, D. R., & Kesner, I. F. 1987. *On the dynamics of corporate size and illegal activity: An empirical assessment*. Paper presented at the annual meeting of the Academy of Management, New Orleans.
- Davis, P. S., Dess, G. G., & Beard, D. W. 1983. *The appropriateness of SIC codes as surrogates of industrial environments: An empirical test*. Paper presented at the annual meeting of the American Institute of Decision Sciences, San Antonio, TX.
- Dess, G. G., & Beard, D. W. 1984. Dimensions of organizational task environments. *Administrative Science Quarterly*, 29: 52–73.
- Dixon, W. J. (Ed.). 1983. *BMDP statistical software*. Berkeley: University of California Press.
- Emery, F. E., & Trist, E. L. 1965. The causal texture of organizational environments. *Human Relations*, 18: 21–32.
- Finney, H. C., & Lesieur, H. R. 1982. A contingency theory of organizational crime. In S. B. Bacharach (Ed.), *Research in the sociology of organizations*, vol. 1: 255–299. Greenwich, CT: JAI Press.
- Galbraith, J. 1973. *Designing complex organizations*. Reading, MA: Addison-Wesley.
- Geis, G. 1977. The heavy electrical equipment antitrust cases of 1961. In G. Geis & R. F. Meier (Eds.), *White-collar crime: Offenses in business, politics, and the professions*: 117–132. New York: Free Press.
- Gross, E. 1978. Organizational crime: A theoretical perspective. In N. K. Denzin (Ed.), *Studies in symbolic interaction*, vol. 1: 55–85. Greenwich, CT: JAI Press.
- Hall, R. H. 1987. *Organizations: Structures, processes, and outcomes* (4th ed.). Englewood Cliffs, NJ: Prentice-Hall.
- Hosmer, D. W., & Lemeshow, S. 1980. Goodness of fit tests for the multiple logistic regression model. *Communications in statistics: Theory and methods*, A9(11): 1043–1069.
- Kesner, I. F., Victor, B., & Lamont, B. T. 1986. Board composition and the commission of illegal acts: An investigation of Fortune 500 companies. *Academy of Management Journal*, 29: 789–799.
- Kimberly, J. 1976. Organizational size and the structuralist perspective: A review, critique, and proposal. *Administrative Science Quarterly*, 21: 571–597.
- Kriesberg, S. M. 1976. Decisionmaking models and the control of corporate crime. *Yale Law Journal*, 85: 1091–1129.

- Lane, R. E. 1953-54. Why business men violate the law. *Journal of Criminal Law, Criminology and Police Science*, 44: 151-165.
- March, J. G., & Simon, H. A. 1958. *Organizations*. New York: John Wiley & Sons.
- New York Times*. 1988. Corporate prison term for Allegheny Bottling. September 1: D2.
- Pfeffer, J., & Salancik, G. R. 1978. *The external control of organizations*. New York: Harper & Row Publishers.
- Pugh, D. S., Hickson, D. J., Hinings, C. R., Lupton, K. M., McDonald, K. M., Turner, C., & Lupton, T. 1983. A conceptual scheme for organizational analysis. *Administrative Science Quarterly*, 8: 289-315.
- Pugh, D. S., Hickson, D. J., Hinings, C. R., & Turner, C. 1968. Dimensions of organizational structure. *Administrative Science Quarterly*, 13: 65-105.
- Simpson, S. S. 1986. The decomposition of antitrust: Testing a multi-level, longitudinal model of profit-squeeze. *American Sociological Review*, 51: 859-875.
- Singh, J. V. 1986. Performance, slack, and risk-taking in organizational decision making. *Academy of Management Journal*, 29: 562-585.
- Staw, B. M., & Sz wajkowski, E. 1975. The scarcity-munificence of organizational environments and the commission of illegal acts. *Administrative Science Quarterly*, 20: 345-354.
- Sz wajkowski, E. W. 1981. *The shadow of effectiveness: An investigation of illegal corporate activity*. Unpublished doctoral dissertation, University of Illinois, Urbana-Champaign.
- Sz wajkowski, E. 1985. Organizational illegality: Theoretical integration and illustrative application. *Academy of Management Review*, 10: 558-567.
- Sz wajkowski, E. 1986. The myths and realities of research on organizational misconduct. In J. E. Post (Ed.), *Research in corporate social performance and policy*, vol. 8: 121-147. Greenwich, CT: JAI Press.
- Tuma, N. B., & Hannan, M. T. 1978. Approaches to the censoring problem in analysis of event histories. In K. Schussler (Ed.), *Sociological methodology 1979*: 209-240. San Francisco: Jossey-Bass.
- Tuma, N. B., Hannan, M. T., & Groeneveld, L. P. 1979. Dynamic analysis of event histories. *American Journal of Sociology*, 84: 820-854.
- Vaughan, D. 1982. Toward understanding unlawful organizational behavior. *Michigan Law Review*, 80: 1377-1402.
- Wall Street Journal*. 1989. Harris Corp. is convicted in kickback plan. June 5: A7.
- Wholey, D. R., & Brittain, J. 1989. Characterizing environmental variation. *Academy of Management Journal*, 32: 867-882.

Melissa S. Baucus received her Ph.D. degree from Indiana University and is currently an assistant professor of management in the College of Business and Economics at the University of Kentucky. Her research interests include illegal corporate behavior, whistle-blowing, and franchising.

Janet P. Near is a professor in and the chairperson of the Department of Management, School of Business, Indiana University, and an adjunct professor of sociology at that university. She received a Ph.D. degree in sociology from the State University of New York at Buffalo. She has published work on whistle-blowing, the relationship between job and life satisfaction, and the effects of Japanese management on organizational commitment among employees.

TESTING A CAUSAL MODEL OF CORPORATE RISK TAKING AND PERFORMANCE

PHILIP BROMLEY
University of Minnesota

The determinants of organizational risk taking and its impact on economic performance are critical issues in strategic management. Using a model that included risk, performance, performance expectations and aspirations, slack, and industry performance, this research addressed how past performance and other factors influence risk taking and how risk taking and other factors influence future performance. Not only did poor performance appear to increase risk taking—risk taking appeared to result in further poor performance, even when past performance, industry performance, and organizational slack were controlled. Overall, the results favor a model in which low performance and lack of slack drive risk taking, but the risks taken have poor returns.

Although risk has long been considered an important aspect of strategic choice, it is only in recent years that researchers in strategic management have become directly concerned with research on risk. Sparked by Bowman (1980, 1982, 1984), many recent studies of strategy have included risk measures. Part of the attention has focused on what Bowman described as a paradox. Using a capital markets analogy, he predicted that risky projects and investments would need to offer higher earnings than other projects to be attractive and that by extension, variable income flows would be associated with high average income. Instead, he found negative associations between variance in returns and the level of returns in some industries.

Since Bowman (1980), numerous studies have investigated risk-return connections. Fiegenbaum and Thomas (1985, 1986) found some industries with positive associations between returns and variance in returns and some with negative associations. They also found that the associations varied over time. Fiegenbaum and Thomas (1988) reported a positive association be-

Funding from the Graduate School of the University of Minnesota and the National Science Foundation under grant number SES-8618355 is gratefully acknowledged. I thank Vijay Nayak and the St. Paul Computing Center staff for assistance in executing this research. Thanks are also due to Morison Asset Management and Lynch, Jones and Ryan for data on analysts' forecasts and to Maureen McNichols and John Hassell for data on the association between corporate and analysts' forecasts. Comments from Raphael Amit, Ned Bowman, Michele Govekar, Ian Maitland, Jim March, Alfred Marcus, Elaine Mosakowski, Richard Saavedra, and this journal's referees on previous versions of this article are gratefully acknowledged.

tween returns and variance in returns for above-average performers and a negative association for below-average performers. This pattern is consistent with Bowman's concept of "risk seeking by troubled firms" (Bowman, 1982: 33), which he associated with the prospect theory of Kahneman and Tversky (1979). Related studies have focused on risk and return relative to diversification (Amit & Livnat, 1988; Bettis & Mahajan, 1985; Chang & Thomas, 1987); business unit risk assessed in terms of both accounting-based measures of systematic risk (Aaker & Jacobson, 1987) and a variety of accounting and operational risk measures (Woo, 1987); and corporate risk and return relative to structural and operational variables (Jemison, 1987; Singh, 1986). Fiegenbaum and Thomas (1988) provide an excellent survey of the risk-return literature.

An underlying difficulty in much of this literature is that researchers wish to make causal statements but are dealing with strictly cross-sectional data.¹ Researchers want to say that a given set of circumstances leads to risk taking or that risk taking has a certain effect on performance, but their analyses usually associate variance in returns with average returns calculated using data from the same time period, making it impossible to differentiate between risk influencing performance and performance influencing risk. Bowman (1984) attempted to disentangle this effect by looking at content analysis measures of risk in one time period and performance in another. His analysis suggested that low performance led to risk taking but that risk taking did not influence future performance.

Previous researchers have clearly recognized this problem of unclear causality. Both Singh (1986) and Woo (1987) noted that their models imposed stringent and untested assumptions concerning the direction of causal relations between risk and performance. They argued that time series models incorporating lags were needed to test such relations more clearly (Singh, 1986: 581; Woo, 1987: 152). Following their suggestions, I attempted to model the impact of past performance on risk taking and the impact of risk taking on subsequent performance.

Specifically, this research addressed two questions: (1) What determines the amount of risk a corporation undertakes? and (2) What effect does that risk taking have on future economic performance? Following Bowman (1980, 1982, 1984) and Fiegenbaum and Thomas (1985, 1986, 1988), I defined risk as the uncertainty of a company's income stream. I addressed the two questions by specifying and estimating a statistical model that includes both the determinants of risk taking and its influence on economic performance. The model estimated is based on the process theory of organizational decision making (cf. Cyert & March, 1963; Simon, 1976).

The answers to the questions addressed in this research may contribute to knowledge in two areas. First, by specifying and testing a model of cor-

¹ Bowman (1982, 1984) and Aaker and Jacobson (1987) are exceptions.

porate risk taking, this work attempts to advance understanding of the determinants of corporate risk taking and performance. It advances the research on risk by (1) presenting and estimating a dynamic model based on a specific theory of organizations, (2) testing for possible ties between risk taking and future economic performance, and (3) using an *ex ante* measure of risk taking. Second, because Cyert and March's (1963) behavioral theory of the firm underlies the model tested, the research can be seen as a large-sample test of that theory.

MODEL DEVELOPMENT

The model used herein was based on Cyert and March's (1963) behavioral theory of the firm. A very brief summary of some of the basic concepts of that theory follows; a more detailed summary appears in chapter 6 of Cyert and March's book. Cyert and March viewed firms as large systems of standard operating procedures, or routines. Managers in firms have both levels of performance they aspire to (aspirations) and levels of performance they expect (expectations). If expectations fall below aspirations, managers search for solutions that can raise expected performance to the aspiration level, and if they cannot find such solutions, they lower aspirations. The system is buffered by slack—excess resources that a company can use to loosen the ties between environmental changes and the need for organizational responses.

Following the behavioral theory of the firm, the current model includes five basic variables: performance, slack, aspirations, expectations, and risk.

Determinants of Risk Taking

A company's performance, the performance of its industry, and its expectations, aspirations, and slack will influence the amount of risk it takes. The model of risk taking used in this research is

$$\begin{aligned} \text{Risk}_{t+1} = & b_0 + b_1 \text{performance}_t + b_2 \text{industry performance}_t \\ & + b_3 \text{expectations}_t + b_4 \text{aspirations}_t + b_5 \text{slack}_t \\ & + b_6 \text{slack}_t^2 + b_7 \text{risk}_t + e, \end{aligned} \quad (1)$$

where

b_i = parameters to be estimated,
 t = year,

and

e = error term.

Performance. The direct impact of performance on risk taking is central to work by Bowman (1980, 1982, 1984) and by Fiegenbaum and Thomas

(1985, 1986, 1988) and was significant in Singh's (1986) research. Fisher and Hall (1969) presented an economic argument for the impact of performance on risk taking: If the utility to a firm of each additional dollar in profits is slightly less than the utility of a previously gained profit dollar (declining marginal utility of income), the expected utility of an investment will decline with increases in the variance of returns for that investment. For a high-variance investment to have equivalent utility to a low-variance investment, the high-variance investment would need to show higher mean performance. Fisher and Hall concluded that "this implies that earnings should be larger, on the average, for firms with greater variation in their earnings than for firms with little earnings variability" (1969: 82).²

Hypothesis 1: Performance has a negative influence on risk ($b_1 < 0$ in Equation 1).

Industry performance. It is hypothesized that industry performance will have a negative influence on risk. The argument parallels that for individual companies. If low performance results in firms taking risky actions, an industry that on the average has low performance will be populated with firms taking risky actions. If competitors are taking risky actions, such as introducing new technologies and new products, a firm of interest will be forced to take such actions to keep up, even if its performance level is high.

Consider, for example, a high-profit firm in a low-profit industry, in which the introduction of new products is the main area of competition. Most firms in the industry are making low profits and consequently take risks by introducing new products. The high-profit firm will be under pressure to match the competitive moves of the other firms in the industry and so will also take risks by introducing new products. Thus, low industry performance should increase risk taking by the firms in an industry over and above the influence of a firm's own performance level.

Hypothesis 2: Average industry performance has a negative influence on risk ($b_2 < 0$ in Equation 1).

Aspirations and expectations. Cyert and March (1963), March and Shapira (1987), and Manns and March (1978) suggested that if a firm aspires to a higher level of performance than it expects to attain under the status quo, it looks for ways to raise its performance. Given the role of routines in increasing predictability (March & Simon, 1958), it is likely that some of the changes to routines occasioned by attempts to increase performance will reduce organizational predictability. Such reductions should increase uncertainty with respect to the outcomes the organization may incur and may in particular increase income stream uncertainty. In an examination of players' responses to a strategic marketing game, Lant and Montgomery (1987) found that performance below aspirations resulted in riskier choices and more innovative search than performance that met or exceeded aspirations.

² For an alternative derivation of this proposition, see Singh (1986).

Although Lant and Montgomery used actual performance to predict risk, I followed the behavioral theory of the firm and used expected performance. Doing so allowed differentiation between the direct effects of performance on risk taking and the effects of the aspirations-expectations process. The income stream of a firm that makes few changes should be more predictable—less risky—than the income stream of a firm that makes many changes. Thus, the level of aspirations should have a positive influence on risk taking, and expectations should have a negative influence.

Similar hypotheses can be based on prospect theory (Kahneman & Tversky, 1979). According to that theory, the level of a firm's aspirations serves as a target or reference level; firms that anticipate returns below that level will be risk seeking, and those that anticipate returns above it will be risk avoiding. Thus, increases in aspirations (the target) will be associated with increases in risk taking, and increases in expectations (anticipated returns) will be associated with decreases in risk taking.

Because the sources of the data on aspirations and expectations used here differed, the scales on which they were measured may not be identical. Consequently, in this research the difference between aspirations and expectations could not be usefully calculated. But if risk is a function of aspirations minus expectations, aspirations should have a positive influence on risk and expectations a negative influence.

Hypothesis 3: Expectations have a negative influence on risk ($b_3 < 0$ in Equation 1).

Hypothesis 4: Aspirations have a positive influence on risk ($b_4 > 0$ in Equation 1).

Slack. The influence of slack on risk taking depends on the relation of slack to a target level of slack (March & Shapira, 1987).³ If slack falls substantially below its target level, managers take risks in order to create additional slack (Cyert & March, 1963; MacCrimmon & Wehrung, 1986; March, 1981). Alternatively, if slack is around the target level, managers take few risks; they see their organization as operating in a satisfactory manner and continue with conventional routines (Cyert & March, 1963). At slack levels well above the target level, managers engage in "slack search" (March, 1981: 214), trying out new ideas.

As MacCrimmon and Wehrung (1986) noted, managers are far more willing to take risks that are very small relative to their organization's current wealth than to take large risks. High levels of available wealth (slack) should therefore result in risk taking. Researchers have associated high levels of

³ Comments by James March on an earlier draft of this article indicated that the paper misinterpreted March and Shapira (1987). Consequently, I changed two hypotheses based on March and Shapira. Although revising hypotheses after data analysis presents serious methodological problems, presenting an erroneous theoretical derivation seemed a more substantial error. The previous hypotheses predicted that slack would have a positive influence on risk taking and squared slack a negative influence in Equation 1.

slack with high levels of innovation, a form of risk taking (e.g., Mansfield, 1961); Greenhalgh (1983) hypothesized that slack would have a positive influence on innovation in declining industries. Slack levels well above or below a company's reference level should increase risk taking, and slack levels near the reference level should reduce it.⁴ Thus, slack should have a nonlinear influence on risk taking, with both high and low levels of slack associated with high levels of risk and moderate levels of slack associated with low levels of risk. The model represents this U-shaped relation by including variables measuring kinds of slack and the squares of these variables. For the U-shape, the coefficient on slack should be negative, and the coefficient on slack squared should be positive.

Hypothesis 5: High and low levels of slack should result in higher levels of risk taking than moderate levels of slack ($b_5 < 0$, $b_6 > 0$ in Equation 1).

Finally, the model includes past risk to control for firm-specific historical influences on risk.

Determinants of Performance

Risk taking, aspirations, expectations, slack, future average industry performance, and past company performance were hypothesized to influence future company performance.

The performance equation is

$$\begin{aligned} \text{Performance}_{t+2} = & c_0 + c_1 \text{performance}_{t+1} + c_2 \text{industry performance}_{t+2} \\ & + c_3 \text{expectations}_{t+1} + c_4 \text{aspirations}_{t+1} \\ & + c_5 \text{slack}_{t+1} + c_6 \text{slack}^2_{t+1} + c_7 \text{risk}_{t+1} + e, \end{aligned} \quad (2)$$

where

c_i = parameters to be estimated,
 t = year,

and

e = error term.

Risk. The authors of much of the literature on innovation, organizational change, and general management have assumed that change and risk taking have a positive influence on future performance (cf. Kanter, 1983; Schon, 1971). Aaker and Jacobson (1987) argued that risk had a positive influence on performance and found support for that view using business unit data. In general, economic analyses have argued that corporations need to be compensated for taking risks with high returns. Capital budgeting

⁴ Staw, Sandelands, and Dutton (1981) presented a "threat rigidity" hypothesis, suggesting that as organizations near bankruptcy they will take fewer risks. Within the population of large industrial firms examined in this research, bankruptcy is extremely rare, so the model does not represent this possibility.

theory uses the measure of systematic risk (beta) to discount future returns; to have the same net present value as a low-risk project, a high-risk project must promise higher future net cash flows.

Hypothesis 6: Risk has a positive influence on future performance ($c_7 > 0$ in Equation 2).

Expectations and aspirations. As has been noted, if expectations fall below aspirations, organizations seek to raise expected performance. Although the discussion concerning Equation 1 focused on the likelihood that such solutions will increase uncertainty, some solutions may raise organizational performance without attendant changes in risk. Companies seeking to improve performance might take steps that raise the uncertainty of their income streams, such as introducing new products or trying new, unproven production technologies, or they might take steps without appreciable risk, such as reducing expenses, tightening controls on production waste, or modestly increasing advertising. A firm might take either approach or both of them depending on the exact circumstances it faces. To construct a model allowing for both strategies, I incorporated the aspirations-expectations process into both the performance and risk equations. Given that a difference between aspirations and expectations should intensify a search for improvements, both equations present the same hypotheses.

Hypothesis 7: Expectations have a negative influence on future performance ($c_3 < 0$ in Equation 2).

Hypothesis 8: Aspirations have a positive influence on future performance ($c_4 > 0$ in Equation 2).

Slack. The direct influence of slack on future performance is unclear (Cyert & March, 1963: 279). Although there are numerous works on slack and risk, little has been written about the causal influence of slack on performance. Within a microeconomic analysis, slack would be seen as wasted resources, so that firms with high levels of slack should result in low performance. But such a slack-performance association is static; it says nothing about the influence of slack on future performance when current performance is controlled. Cyert and March (1963) and Thompson (1967) argued that slack may be useful to organizations because it provides an essential buffer to their activities. Without slack, any reductions in cash flow will result in immediate shortages of funds. Such shortages will result in dysfunctional organizational changes such as layoffs and cancellation of capital investments. Firms use slack to smooth investment, staffing, and so forth and to buffer their technological cores from short-term random fluctuations in the environment.

Slack also allows firms the ability "to take advantage of opportunities afforded by that environment" (Thompson, 1967: 150). Firms with additional resources have more strategic options available than firms without resources. Thus, available resources in the form of slack provide a strategic advantage, but only if the resources are large relative to those of the compe-

tition. Alternatively, a lack of slack may force a company to manage very carefully. There are many examples of companies that, in the face of shortages of slack, found ways to reduce costs and improve performance. Firms with levels of slack substantially below the normal for their industry may be expected to take such actions. Thus, firms with much slack obtain a competitive advantage and firms with little slack must manage carefully. Either action should increase performance.

Hypothesis 9: High and low levels of slack result in high levels of performance, and moderate levels of slack result in low levels of performance ($c_5 < 0$, $c_6 > 0$ in Equation 2).

Two variables were included in the performance equation as controls. Average industry performance controls for industry-wide factors that may influence performance. Previous performance controls for firm-specific historical effects. Both should have positive influences on future performance.

MEASUREMENT AND ESTIMATION

The model requires measures for risk, performance, aspirations, expectations, and slack.

Measuring Risk

Previous studies of risk-return relations have defined risk as the unpredictability of a firm's income stream (Bowman, 1980; Conrad & Plotkin, 1968; Fiegenbaum & Thomas, 1985; Fisher & Hall, 1969). These studies have measured risk by the ex post, or actual, variance of a firm's return on investment or equity.

In this research, risk was measured as the ex ante uncertainty of a firm's earnings stream. Conventional measures of income stream risk, such as the variance in a firm's return on assets (ROA) and the variance of ROA around a time trend, measure ex post uncertainty, which may differ substantially from the uncertainty occurring before the time period. In 1970, an oil company might have expected the 1970s to be a stable period and would have based its actions on that expectation rather than on the uncertainty that the Organization of Petroleum Exporting Countries (OPEC) introduced. Thus, ex ante measures of risk may be preferable to ex post measures (Bowman, 1982; Silhan & Thomas, 1986). In addition, it is desirable to use a risk measure that differentiates between predictable changes in outcomes, which are not risky, and risky unpredictable changes in outcomes. Measures like variance in returns classify businesses with predictable but rapidly growing returns as highly risky and those with stable or slowly declining returns as not risky (Cardozo & Smith, 1983).

If a number of analysts forecast the earnings of a given corporation, the variance in their forecasts should be strongly associated with the ex ante uncertainty of that earnings stream. Consequently, I measured the risk of a company's income stream for a given year by the variance in security ana-

lysts' forecasts of that income. Extensive research on capital markets has used the divergence of analysts' forecasts as a measure of uncertainty (Brown, Richardson, & Schwager, 1987; Carvell & Strebel, 1984; Givoly & Lakonishok, 1988; Imhoff & Lobo, 1984, 1987; Malkiel, 1982); further, Conroy and Harris (1987) provided results supporting use of this measure. I assumed that the greater the variance in such forecasts, the less predictable and consequently the more risky the income stream. Means and standard deviations of analysts' forecasts are available from the Institutional Brokers Estimate System (IBES). The risk for a company in a given year is measured by the standard deviation of the securities analysts' forecasts of earnings per share for the year. This research used the forecasts from the January IBES report.

Other Measures

All the analyses presented below were executed using return on total assets (ROA), return on equity (ROE), and return on sales (ROS) as performance measures. Since the results agreed across the three measures, only the ROA results are discussed here in order to conserve space and simplify presentation.⁵ Industry performance was the average ROA for firms with a given two-digit Standard Industrial Classification (SIC) code.

Expectations were measured by the mean of the earnings forecasts produced by securities analysts. A substantial body of literature indicates that such forecasts not only predict earnings reasonably well, but also contain new information that the stock market has not previously considered (Barefield & Comiskey, 1975; Brown & Rozeff, 1978; Collins & Hopwood, 1980; Fried & Givoly, 1982; Imhoff & Lobo, 1984; Hassell & Jennings, 1986; O'Brien, 1988). Management and analysts' forecasts correlated .90 in the data described in McNichols (1989) and .97 in the data described in Hassell and Jennings (1986).⁶ Thus, analysts' forecasts correlate sufficiently highly with those of management to be considered a reasonable proxy. The original forecasts used here, which are in terms of earnings per share, were converted to ROA by multiplying by shares divided by total assets from the previous year.

March and Simon (1958) argued that past performance and comparison to the performance of others will strongly influence aspiration levels. Other researchers (e.g., Cyert & March, 1963; Lant & Montgomery, 1987; Levinthal & March, 1981; March, 1988) have modeled aspirations as a function of the difference between previous aspiration levels and previous performance. These models often result in aspirations being a function of past performance levels. Eliasson (1976) noted that corporations raise targets to slightly above their previous performance level.

The performance of other companies should also influence aspiration

⁵ Complete results using all three performance measures are available from the author.

⁶ Professor Maureen McNichols kindly estimated the correlation coefficient and Professor John Hassell kindly provided the data used to estimate the second correlation.

levels. Fiegenbaum and Thomas (1988) and Lev (1974) argued that average performance forms a target level for firms in an industry. Herriott, Levinthal, and March (1985) modeled aspirations as a function of both past performance and the average performance of comparable firms. A firm that performs well below industry norms is hardly likely to aspire to continued below-average performance. A firm that performs above industry norms will not aspire to average performance.

The measure of aspirations used here combines past performance and average industry performance. For firms with performance above the mean for their industry, I represented aspirations by multiplying past performance (ROA) by 1.05.⁷ For firms performing below their industry's mean, I set aspirations equal to that level of performance. Thus, I assumed that firms performing below their industry's average aspire to the average and firms performing above it aspire to improve their current position. This measure, which conforms to the theoretical propositions justifying it and is related to previously used measures, appears to be reasonable but has not been empirically validated.

Bourgeois and Singh (1983) divided slack into three categories—available, recoverable, and potential slack—that differentiate the extent to which resources are available (cf. Bourgeois, 1981; Hambrick & D'Aveni, 1988). Following Bourgeois and Singh, I employed indicators of each kind of slack. A company's current ratio, or current assets divided by current liabilities, represented available slack, and selling, general, and administrative expenses divided by sales (SG&A/sales) represented recoverable slack. Potential slack had two measures: the debt-to-equity ratio, which reflects a lack of potential slack, and the interest coverage ratio, calculated as the ratio of income before taxes and interest charges to interest charges, which indicates the presence of potential slack. A corporation with a high debt-to-equity ratio has a relatively low ability to obtain additional funds through incurring debt and thus has little potential slack. A corporation with a larger income relative to interest charges is better able to take on additional debt than a corporation with low income relative to interest charges and thus has potential slack.

Data and Estimation

The data used to estimate the model included all firms classified under Standard Industrial Codes (SIC) 3000 to 3999 and for which both accounting data from Standard and Poor's COMPUSTAT tapes and analyst forecast data

⁷ The 1.05 adjustment factor appeared reasonable in light of previous research (cf. Bromiley, 1986; Lant & Montgomery, 1987). To test the sensitivity of the results to this parameter, I constructed aspiration variables using a 1.25 and a 1.50 adjustment factor. The correlations between the aspiration variable using 1.05 and those using 1.25 and 1.50 are .99 and .97, respectively. I also estimated the risk and performance equations using the 1.50 adjustment rate and obtained estimates that agreed with those based on the 1.05 rate. The results presented are not sensitive to the adjustment rate assumption.

from IBES were available. The study examined only manufacturing companies to mitigate difficulties produced by using accounting data from vastly different kinds of businesses; accounting in banks, for instance, differs substantially from accounting in manufacturing firms. Following initial model estimation, I eliminated observations with leverage over four times the average leverage or studentized residuals over four (see Judge, Hill, Griffiths, Lutkepohl, & Lee, 1988) to ensure that a small number of extreme outliers did not overly influence the results. The IBES data begin in 1976 and the COMPUSTAT data employed end in 1987. After construction and lagging of the instrumental variable (described below), a maximum of nine usable observations per company remained. The final data covered 288 companies.

Since the equations, which include lagged dependent variables, were likely to have autoregressive error terms, I estimated them using an instrumental variable procedure (cf. Johnston, 1984). In creating the instrument for the lagged dependent variable, I included all the other independent variables for a given year and for one year before it in the regression. The SAS Autogreg procedure with instrumental variables (SAS Institute, 1984: 192–193) was employed with missing data points inserted between companies to ensure that serial correlation was not defined across companies. This procedure uses a generalized least-squares approach to correct for serial correlation. Table 1 presents means, standard deviations, and correlations among the variables.

RESULTS

Table 2 presents the results concerning risk taking. All tests were two-sided, a conservative approach given that I was testing directional hypotheses. Consistent with Hypothesis 1 and a variety of earlier studies (Bowman, 1982; Singh, 1986), performance has a strong negative influence on risk taking. Past industry performance also has a significant, negative influence on risk taking. Contrary to Hypothesis 3, expectations have a positive influence on risk taking. Aspirations, in agreement with Hypothesis 4, have a significant, positive influence on risk taking. Previous risk has a positive and significant parameter estimate.

Because the correlations between the linear and squared slack variables are high, the results on slack are somewhat complicated to interpret. Although the estimates remain consistent, the collinearity results in imprecise parameter estimates and large standard errors (Johnston, 1984; Judge, Griffiths, Hill, Lutkepohl, & Lee, 1985; Kennedy, 1985). To assist in interpretation, I estimated the model both with and without the squared slack terms (see Table 2).

Available and recoverable slack have significant negative coefficients in the regression equations both with and without squared terms. Interest coverage has negative coefficients in both equations, but the coefficient estimate is only significant when the squared slack terms are included. The debt-to-equity ratio has a negative and insignificant coefficient when squared

TABLE 1
Descriptive Statistics and Correlations^a

Variables	Means	s.d.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. Performance _{t+1}	0.060	0.050																	
2. Performance _t	0.063	0.049	.70																
3. Industry performance _{t+1}	0.047	0.026	.41	.31															
4. Industry performance _t	0.051	0.027	.30	.42	.73														
5. Risk _{t+1}	0.191	0.228	-.37	-.47	-.24	-.29													
6. Risk _t	0.182	0.260	-.30	-.35	-.21	-.27	.53												
7. Expectations _{t+1}	0.050	0.047	.36	.57	.05	.16	-.31	-.19											
8. Expectations _t	0.052	0.038	.16	.38	-.05	.07	-.13	-.22	.66										
9. Aspirations _{t+1}	0.074	0.037	.90	.69	.54	.40	-.38	-.32	.34	.16									
10. Aspirations _t	0.078	0.037	.67	.89	.39	.56	-.42	-.36	.52	.37	.75								
11. Current ratio _t	2.359	0.860	.17	.22	.04	.06	-.26	-.23	.12	.23	.21	.25							
12. SG&A-to-sales ratio _t	0.208	0.107	.06	.05	.02	.05	-.24	-.21	.05	.10	.11	.11	.33						
13. Interest coverage _t ^b	0.120	0.172	.43	.53	.14	.17	-.23	-.19	.31	.25	.45	.53	.17	-.02					
14. Debt-to-equity ratio _t	0.305	0.275	-.30	-.40	-.10	-.16	.27	.22	-.29	-.28	-.30	-.38	-.09	-.13	-.40				
15. Current ratio _t ²	6.302	4.989	.14	.18	.04	.05	-.21	-.20	.07	.20	.19	.22	.97	.29	.17	-.08			
16. SG&A-to-sales ratio _t ²	0.055	0.052	.03	.02	-.00	.03	-.18	-.17	.03	.09	.09	.09	.27	.97	-.04	-.10	.24		
17. Interest coverage _t ^{2b}	0.044	0.185	.23	.24	.06	.06	-.09	-.08	.14	.11	.26	.27	.11	-.02	.87	-.21	.13	-.02	
18. Debt-to-equity _t ²	0.169	0.423	-.17	-.26	-.07	-.14	.19	.15	-.20	-.19	-.18	-.24	-.08	-.10	-.19	.85	-.06	-.08	-.09

^a $N \geq 1,540$.

^b Interest coverage has been multiplied by .01 and Interest coverage squared by .0001.

TABLE 2
Determinants of Risk Taking^a

Dependent Variables	Risk _{t+1}	Risk _{t+1}
Constant	0.490** (0.052)	0.356** (0.036)
Risk _t	0.163** (0.042)	0.210** (0.042)
Performance _t	-3.598** (0.216)	-3.136** (0.199)
Industry performance _t	-1.259** (0.337)	-1.257** (0.332)
Expectations _t	0.271† (0.140)	0.183 (0.133)
Aspirations _t	2.919** (0.391)	2.632** (0.356)
Current ratio _t	-0.061* (0.026)	-0.022* (0.010)
SG&A-to-sales ratio _t	-0.891** (0.253)	-0.452** (0.082)
Interest coverage _t ^b	-0.007* (0.001)	-0.056 (0.043)
Debt-to-equity ratio _t	-0.005 (0.025)	0.050** (0.013)
Current ratio _t ²	0.007† (0.004)	
SG&A-to-sales ratio _t ²	0.769† (0.465)	
Interest coverage _t ^{2b}	0.047 (0.030)	
Debt-to-equity ratio _t ²	0.003 (0.003)	
R ²	.48	.45
ρ ^c	-.290**	-.284**
N	1,288	1,286

^a Standard errors appear in parentheses under parameters.

^b Interest coverage has been rescaled by multiplying it by .01. Interest coverage squared has been multiplied by .0001.

^c This statistic is a coefficient of serial correlation.

† $p < .10$

* $p < .05$

** $p < .01$

terms are included but a positive and significant coefficient when they are not. Thus, dependable linear effects consistent with the hypotheses emerge for available and recoverable slack. The results on potential slack were weak, with only two of the four parameter estimates statistically significant, although both significant estimates agree with the hypothesis.

The results for available and recoverable slack squared are both positive as hypothesized but significant at only the 10 percent level. The potential slack variables are both insignificant. The hypothesis that all the squared slack terms have zero coefficients can be rejected, but only at the 6 percent

level ($F_{15,1284} = 2.27, p < .06$). In other words, I found only the weakest support for the presence of a nonlinear influence of slack on risk.

Even if slack has a nonlinear effect on risk, the nonlinearity results in slack having almost no influence on risk for high values of slack rather than the positive influence hypothesized. By taking the derivative of the risk equation with respect to each slack variable and setting it equal to zero, I estimated where the total effect of the linear and nonlinear slack terms switched from negative to positive. For both the current ratio (available slack) and the ratio of selling, general, and administrative expenses to sales (recoverable slack), under 4 percent of the observations have values that would indicate a positive influence of slack on risk. Rather than generating a U-shaped curve, the influence of changes in slack on risk starts negative and declines to zero for high values of slack. The nonlinear parameter estimates cannot be interpreted as support for the proposition that slack allows risk taking.

Table 3 presents the results concerning future performance. As hypothesized, industry performance has significant, positive parameter estimates. Past performance has an insignificant parameter estimate. Contrary to the hypothesis, the risk parameter is negative and significant. Expectations have the hypothesized negative influence on performance, and aspirations have the hypothesized positive influence, both significant.

Collinearity complicates interpretation of the slack coefficients in the performance equation as it did in the risk equation. Although the slack variables clearly influence performance, their influence is not consistent with the hypotheses. The current ratio (available slack) and interest coverage (potential slack) have positive influences on performance. The debt-to-equity ratio (potential slack) has negative coefficients in regression equations both with and without the squared slack terms, but the coefficient is only significant when the squared terms are not included. The SG&A-to-sales ratio (recoverable slack) has negative but insignificant parameter estimates. The estimates indicate that available slack, in the form of current ratio, and potential slack, in the form of interest coverage, both have positive influences on performance and that potential slack, in the form of the debt-to-equity ratio, may have a positive influence.

Of the squared slack terms, only the current ratio squared is significant, and it is negative. The hypothesis that all the squared slack terms have zero coefficients can be rejected, but only at the 10 percent level. Approximately 10 percent of the current ratio values fall in the range in which increases in slack would result in decreases in performance. Overall, the results do not provide strong support for the existence of a nonlinear influence of slack on performance.

Further Investigations

In this section, I examine the stability of the parameter estimates across industry, performance, and size. In addition, the long-run effects of risk on performance are examined.

TABLE 3
Determinants of Performance^a

Dependent Variables	Performance _{t+2}	Performance _{t+2}
Constant	-0.016† (0.010)	-0.005 (0.006)
Performance _{t+1}	-0.043 (0.044)	0.026 (0.046)
Industry performance _{t+2}	0.623** (0.051)	0.656** (0.055)
Risk _{t+1}	-0.019** (0.004)	-0.019** (0.005)
Expectations _{t+1}	-0.094* (0.038)	-0.018 (0.041)
Aspirations _{t+1}	0.511** (0.050)	0.370** (0.043)
Current ratio _{t+1}	0.015* (0.006)	0.004* (0.002)
SG&A-to-sales ratio _{t+1}	-0.037 (0.049)	-0.010 (0.014)
Interest coverage _{t+1} ^b	0.060** (0.021)	0.044** (0.011)
Debt-to-equity ratio _{t+1}	-0.014 (0.009)	-0.012** (0.004)
Current ratio _{t+1} ²	-0.002* (0.001)	
SG&A-to-sales ratio _{t+1} ²	0.059 (0.095)	
Interest coverage _{t+1} ^{2b}	-0.023 (0.017)	
Debt-to-equity ratio _{t+1} ²	0.001 (0.004)	
R ²	.45	.42
ρ ^c	-.149**	-.170**
N	1,310	1,299

^a Standard errors appear in parentheses under parameters.

^b Interest coverage has been rescaled by multiplying it by .01. Interest coverage squared has been multiplied by .0001.

^c This statistic is a coefficient of serial correlation.

† $p < .10$

* $p < .05$

** $p < .01$

Interindustry differences. Previous researchers (Bowman, 1980, 1984; Fiegenbaum & Thomas, 1986) have found strong interindustry differences in the risk-performance association. Consequently, I tested whether the parameters of the model differed across industries. First, I grouped the data by two-digit SIC codes and estimated the risk and performance equations for each industry using the same estimation procedure described above. Using a Chow test (Kennedy, 1985), I tested the hypothesis that the parameters were equal across industries and was able to reject it for both the risk and the

performance equation (risk, $F_{135,996} = 2.49$; performance, $F_{135,1140} = 1.92$, $p < .001$).

Performance and size differences. The effects reported here may also depend on the performance or size of an organization. Fiegenbaum and Thomas (1988) and Fiegenbaum (1990) argued that low performers seek risk and high performers avoid it, resulting in a negative risk-return relation for low performers and a positive risk-return relation for high performers. If this is true, past performance should have a positive parameter in the risk equation using data from the top quartile of performers and a negative parameter in the equation using data from the bottom quartile.

Hambrick and D'Aveni (1988) found that firms that went bankrupt had lower levels of slack, particularly as indicated by their debt-to-equity ratio, lower returns on assets, and higher variability in initiating new projects than a matched sample of nonbankrupt firms. They discussed the possibility that there is something particular about the decision-making or management processes in these firms that builds from these conditions and leads to bankruptcy. If this were so, high performers and low performers would differ in their risk taking and in the relation of risk taking to future performance.

Since the process by which a company responds to changes in internal and external factors should depend more on long-run experience than on short-run experience, I grouped companies into quartiles based on their average ROA and average sales over the 11 years of data available on ROA and sales. The risk and performance equations were estimated for each quartile defined by average company ROA and sales and the parameters tested for equality across the quartiles.

For both the ROA- and sales-defined divisions, I could strongly reject the hypothesis that the parameters of the equations are equal across quartiles.⁸ All F s are significant beyond .001.

To summarize the primary features of the quartile-based parameter estimates, I found no sign changes for any of the variables that were significant in the overall equations. Contrary to the findings of Fiegenbaum and Thomas (1988) and of Fiegenbaum (1990), past performance has a negative influence on risk in all eight quartile equations, and it is significant in all but the top ROA-defined group. The estimates of the influence of risk on subsequent performance are negative and significant in all sales-defined quartiles and negative in three of the four performance quartiles. They are significant only in the third performance quartile; the parameter estimate for the top performance group was positive and insignificant. Although I can reject the hypothesis that parameters are equal across quartiles, in no case did the sign of a significant coefficient switch between top and bottom quartiles. The degree

⁸ With the ROA-based quartiles, the results for the risk equation are $F_{45,1086} = 4.00$, and for the performance equation they are $F_{45,1239} = 9.02$. With the sales-based quartiles, the results are $F_{45,1086} = 3.05$ for risk and $F_{45,1239} = 5.30$ for performance.

of association appears to differ, but I cannot demonstrate that the major feature of the influence—its direction—varies across quartiles.

Long-run effects. Finally, the possibility exists that risk in a given year has a negative influence on performance in the next year but a positive influence in subsequent years. I examined this possibility using the same performance model presented earlier (Equation 2) with two changes. First, instead of explaining performance in a given year by variables measured in the previous year, I explained performance by variables measured two to four years previously. Thus, the model estimates the influence of risk in a given year on performance up to four years later (in terms of Equation 2, years $t + 3$ to $t + 5$). Second, I dropped lagged performance since it was insignificant in the one-year estimates and substantially complicated estimation of the model. Constructing the instrument for lagged performance resulted in large reductions in data, which lowered the precision of the estimates. Risk in a given year had significant, negative influences on performance in all these estimates. The magnitude of the influence of risk in a given year on performance four years later was larger than the influence of risk in a given year on performance in the very next year.

Given these results, what general observations can be derived? First, the parameters in the model differ when estimated across industries, across quartiles defined by average ROA, and across quartiles defined by average sales. Second, the data fail to support the argument that performance has a positive influence on risk for high performers. Third, risk in a given year negatively influences performance up to four years later. Fourth, it appears likely that the factors influencing risk taking and performance differ in magnitude across performance and size levels, but the results do not indicate that the signs of the effects differ. In other words, it is not clear that differing behavioral models are justified for firms at differing performance levels.

CONCLUSIONS, DISCUSSION, AND FURTHER DIRECTIONS

Reviewing Bowman's (1980) risk-return paradox and related work (Fiegenbaum & Thomas, 1985, 1986; Jemison, 1987; Singh, 1986), the issue of the causal relations among past performance, risk taking, and future performance became apparent. The results presented here, although more complex than previous results in the area, may shed some light on the problem.

The Risk Model

The estimation results strongly support the risk model. With the exception of expectations' positive influence on risk, all the significant parameters have the hypothesized signs. Several of the results on the determinants of risk taking are worth further discussion. Industry performance has a negative parameter, suggesting that low average industry performance results in less certain income streams for the corporations in an industry. Variables measuring both expectations and aspirations have positive and significant in-

fluences on risk; in an analysis in which past performance was held constant, companies expecting to perform well took on additional risk, and the higher their aspirations, the greater the risks they took. Slack appears to reduce risk taking. The negative influence of firm performance, industry performance, and slack on risk taking support the notion that low performance drives risk taking rather than the argument that slack allows room for it. As noted above, the parameter values indicate that the data do not support the argument that slack allows risk taking even for high levels of slack.

These overall results are important for two reasons. First, they constitute one of the very few quantitative, large-scale tests of the behavioral theory of the firm. Almost all previous relevant work has been qualitative research or quantitative work using very small samples. Second, the present results support a theoretically justified model of risk taking that is substantially more complex than previous models. Although some previous work has employed more variables than this study, theoretical justification for many of these models was absent; for instance, work using the PIMS data base has usually included numerous variables because they were significant in previous studies (cf. Aaker & Jacobson, 1987; Woo, 1987).

The Performance Model

The performance model supported the following conclusions: (1) risk reduces subsequent performance, (2) aspirations have the hypothesized positive influence on performance and expectations a negative influence, and (3) slack, particularly available and potential slack, increases performance. Overall, these results support the utility of financial resources in increasing performance.

The Interaction of Risk and Performance

If just the interaction of performance and risk is reviewed, the results suggest that performance has a negative influence on risk taking and that risk taking has a negative influence on future performance. Thus, not only does low performance result in a company's income stream becoming more risky—such riskiness lowers future performance even when factors such as past and industry performance are controlled.

If risk and performance constituted the entire model tested here, these findings would be extremely worrisome. If performance has a negative influence on risk, which in turn has a negative influence on future performance, the potential exists for a vicious circle: once a firm starts to perform poorly, matters will keep getting worse and worse. Alternatively, a high performer, once started, can keep earning higher and higher returns with less and less risk. The parameter values presented indicate that although such negative feedback does exist, it is small relative to other effects. For example, a .05 reduction in ROA (approximately one standard deviation) would result in a .003 reduction in ROA two years later. Thus, the relations of performance and risk do create a negative feedback loop, but it is of such small magnitude that other factors overwhelm it.

Comparisons with Other Studies

Bowman suggested that poorly performing firms may seek risky investments in a manner similar to the risk seeking of individuals found in research on behavioral decision theory. An important issue in risk seeking by individuals that had not been addressed using corporate data is whether such risk taking is sensible or not. The interesting part of risk seeking by individuals is not simply that poor performers take more risks, but rather that they take bad gambles—risks with low expected values. The results presented here suggest a similar phenomenon: low business performance results in taking more risk, and that risk has a negative influence on future performance, over and above what would be expected from past performance and an industry's performance. Thus, it appears that firms performing poorly do indeed make risky and low-payoff strategic choices.

These results agree to some extent with the results of Bowman's (1984) content analysis of risk taking but do not agree with his finding that risk taking has no impact on future performance (Bowman, 1984). Although the exact reasons for this difference cannot be determined, it should not be cause for great concern. The multivariate techniques and much larger data set used here (over 1,000 observations compared to Bowman's 26) may have simply facilitated picking up effects that were too small to emerge with Bowman's bivariate techniques and small sample.

The same cannot be said of discrepancies with Aaker and Jacobson's (1987) work using the PIMS data base. They found that two measures of variability in return on investment (accounting-based measures of systematic and unsystematic variance) both had positive influences on performance. Some substantial methodological differences exist between this study and Aaker and Jacobson's: their data were from business units, mine from corporations; their model was cross-sectional with a lagged dependent variable, mine a pooled cross-sectional time series model; and the risk measures used differed. Exactly why such differences would give these results is not clear, but the varying definitions of risk offer a particularly likely explanation. Aaker and Jacobson used accounting data on ROI from a given time period to estimate beta and unsystematic risk and then apparently used these estimates in regression equations that explain ROI over the same time period. I join Fiegenbaum and Thomas (1988) in emphasizing the need for further work on the meaning and measurement of strategic risk (see also Miller & Bromiley, 1990).

The factors influencing risk taking appear to vary at least in magnitude across industries, performance levels, and sales levels. The present results contrast with those of Fiegenbaum and Thomas (1988), who found that risk-return associations differed in sign for high- and low-performing industries and that no association between risk and return was visible for firms near an average industry performance level. Although the aggregate findings of the two studies agree in that low performance is associated with high risk and vice versa in both, specific findings differ. This study found negative influ-

ences of performance on risk in all quartiles and positive influences of risk on performance. It may be that adding additional control variables to the bivariate approach used by Fiegenbaum and Thomas will explain the differences in findings.

Only two of Singh's (1986) findings on the determinants of risk are comparable to the results presented here. The studies agree in finding that performance reduces risk taking. On the other hand, Singh found that absorbed slack, which he measured by the ratios of selling, general, and administrative expenses and of working capital to sales, had a positive influence on risk but that the quick ratio (cash and marketable securities divided by current liabilities) had no significant influence on risk. I found that both expenses divided by sales and the current ratio had negative effects on risk. Although the numerous methodological differences between the two studies may explain the differences in results, a particularly interesting possibility is that substantial differences exist between Singh's measure of managerial perceptions of risk and measures of income stream uncertainty.

This article has presented a dynamic model of risk taking and performance and estimations of the model using ex ante measures of risk rather than the more conventional ex post measures. A number of factors limit the generality of the findings: studying large manufacturing companies, measuring risk with income stream uncertainty, potential measurement errors, and the omission of substantive measures of risky actions. However, the results are interesting in their own right and also suggest a number of additional studies. The effect of using alternative functional forms to measure expectations, aspirations, and slack warrants further exploration (Duhaimé & Davis, 1986). The differences among quartiles of companies defined by performance strongly suggest a more complex theory may be needed so that these parameter differences can be explained rather than simply estimated. Finally, researchers might use other data bases to test the generality of these results.

REFERENCES

- Aaker, D. A., & Jacobson, R. 1987. The role of risk in explaining differences in profitability. *Academy of Management Journal*, 30: 277-296.
- Amit, R., & Livnat, J. 1988. Diversification and the risk-return trade-off. *Academy of Management Journal*, 31: 154-166.
- Barefield, R., & Comiskey, E. 1975. The accuracy of analysts' forecasts of earnings per share. *Journal of Business Research*, 3: 241-252.
- Bettis, R. A., & Mahajan, V. 1985. Risk/return performance of diversified firms. *Management Science*, 31: 785-799.
- Bourgeois, L. J. 1981. On the measurement of organizational slack. *Academy of Management Review*, 6: 29-39.
- Bourgeois, L. J., & Singh, J. V. 1983. Organizational slack and political behavior within top management groups. *Academy of Management Proceedings*: 43-49.
- Bowman, E. H. 1980. A risk/return paradox for strategic management. *Sloan Management Review*, 21(3): 17-31.

- Bowman, E. H. 1982. Risk seeking by troubled firms. *Sloan Management Review*, 23(4): 33–42.
- Bowman, E. H. 1984. Content analysis of annual reports for corporate strategy and risk. *Interfaces*, 14: 61–71.
- Brown, L. D., Richardson, G. D., & Schwager, S. J. 1987. *An information interpretation of financial analyst superiority in forecasting earnings*. Working paper, State University of New York at Buffalo.
- Brown, L. D., & Rozeff, M. S. 1978. The superiority of analyst forecasts as measures of expectations: Evidence from earnings. *Journal of Finance*, 33: 1–6.
- Cardozo, R. N., & Smith, D. K. 1983. Applying financial portfolio theory to product portfolio decisions: An empirical study. *Journal of Marketing*, 47: 110–119.
- Carvell, S., & Strebelt, P. 1984. A new beta incorporating analysts' forecasts. *Journal of Portfolio Management*, 11: 81–85.
- Chang, Y., & Thomas, H. 1987. The impact of diversification strategy on risk-return performance. *Academy of Management Proceedings*: 2–6.
- Collins, W. A., & Hopwood, W. S. 1980. A multivariate analysis of annual earnings forecasts generated from quarterly forecasts of financial analysts and univariate time-series models. *Journal of Accounting Research*, 18: 390–406.
- Conrad, G. R., & Plotkin, I. H. 1968. Risk/return: U.S. industry pattern. *Harvard Business Review*, 46(2): 90–99.
- Conroy, R., & Harris, R. 1987. Consensus forecasts of corporate earnings: Analysts' forecasts and time series methods. *Management Science*, 33: 725–738.
- Cyert, R. M., & March, J. G. 1963. *A behavioral theory of the firm*. Englewood Cliffs, NJ: Prentice-Hall.
- Duhaime, I. M., & Davis, R. 1986. *Acquisition activity and organizational slack*. BEBR faculty working paper no. 1246, College of Commerce, University of Illinois at Urbana-Champaign.
- Eliasson, G. 1976. *Business economic planning*. London: John Wiley & Sons.
- Fiengenbaum, A. 1990. Prospect theory and the risk-return association: An empirical examination in 85 industries. *Journal of Economic Behavior and Organization*, 14: 187–204.
- Fiengenbaum, A., & Thomas, H. 1985. An examination of the structural stability of Bowman's risk-return paradox. *Academy of Management Proceedings*: 7–10.
- Fiengenbaum, A., & Thomas, H. 1986. Dynamic and risk measurement perspectives on Bowman's risk-return paradox for strategic management: An empirical study. *Strategic Management Journal*, 7: 395–408.
- Fiengenbaum, A., & Thomas, H. 1988. Attitudes toward risk and the risk-return paradox: Prospect theory explanations. *Academy of Management Journal*, 31: 85–106.
- Fisher, I. N., & Hall, G. R. 1969. Risk and corporate rates of return. *Quarterly Journal of Economics*, 83: 79–92.
- Fried, D., & Givoly, D. 1982. Financial analysts' forecasts of earnings: A better surrogate for market expectations. *Journal of Accounting and Economics*, 4: 85–107.
- Givoly, D., & Lakonishok, J. 1988. Divergence of earnings expectations: The effect on stock market response to earnings signals. In E. Dimson (Ed.), *Stock market anomalies*: 272–289. New York: Cambridge University Press.
- Greenhalgh, L. 1983. Organizational decline. In S. Bacharach (Ed.), *Research in the sociology of organizations*, vol. 2: 231–276. Greenwich, CT: JAI Press.
- Hambrick, D. C., & D'Aveni, R. A. 1988. Large corporate failures as downward spirals. *Administrative Science Quarterly*, 33: 1–23.

- Hassell, J. M., & Jennings, R. H. 1986. Relative forecast accuracy and the timing of earnings forecast announcements. *Accounting Review*, 61: 58-75.
- Herriott, S. R., Levinthal, D., & March, J. G. 1985. Learning from experience in organizations. *American Economic Review*, 75: 298-302.
- Imhoff, E. A., & Lobo, G. 1984. Information content of analysts' composite forecast revisions. *Journal of Accounting Research*, 22: 541-554.
- Imhoff, E. A., & Lobo, G. 1987. *The impact of earnings forecast uncertainty on the information content of unexpected annual earnings*. Working paper, University of Michigan, Ann Arbor.
- Jemison, D. B. 1987. Risk and the relationship among strategy, organizational processes, and performance. *Management Science*, 33: 1087-1101.
- Johnston, J. 1984. *Econometric methods* (3d ed.). New York: McGraw-Hill Book Co.
- Judge, G. G., Griffiths, W. E., Hill, R. C., Lutkepohl, H., & Lee, T. 1985. *The theory and practice of econometrics* (2d ed.). New York: John Wiley & Sons.
- Judge, G. G., Hill, R. C., Griffiths, W. E., Lutkepohl, H., & Lee, T. 1988. *Introduction to the theory and practice of econometrics* (2d ed.). New York: John Wiley & Sons.
- Kahneman, D., & Tversky, D. 1979. Prospect theory: An analysis of decisions under risk. *Econometrica*, 47: 262-291.
- Kanter, R. M. 1983. *The changemasters*. New York: Simon & Schuster.
- Kennedy, P. 1985. *A guide to econometrics* (2d ed.). Cambridge, MA: MIT Press.
- Lant, T. K., & Montgomery, D. B. 1987. Learning from strategic success and failure. *Journal of Business Research*, 15: 503-517.
- Lev, B. 1974. On the association between operating leverage and risk. *Journal of Financial and Quantitative Analysis*, 9: 627-641.
- Levinthal, D., & March, J. G. 1981. A model of adaptive organizational search. *Journal of Economic Behavior and Organization*, 2: 307-333.
- MacCrimmon, K. R., & Wehrung, D. A. 1986. *Taking risks: The management of uncertainty*. New York: Free Press.
- McNichols, M. 1989. Evidence of informational asymmetries from management earnings forecasts and stock returns. *Accounting Review*, 64: 1-27.
- Malkiel, B. G. 1982. Risk and return: A new look. In B. M. Friedman (Ed.), *The changing roles of debt and equity in financing U.S. capital formation*: 27-45. Chicago: University of Chicago Press.
- Manns, C. L., & March, J. G. 1978. Financial adversity, internal competition, and curriculum change in a university. *Administrative Science Quarterly*, 23: 541-552.
- Mansfield, E. 1961. Technical change and the rate of imitation. *Econometrica*, 29: 741-766.
- March, J. G. 1981. Decisions in organizations and theories of choice. In A. H. Van de Ven & W. F. Joyce (Eds.), *Perspectives on organizational design and behavior*: 205-248. New York: John Wiley & Sons.
- March, J. G. 1988. Variable risk preferences and adaptive aspirations. *Journal of Economic Behavior and Organization*, 9: 5-24.
- March, J. G., & Shapira, Z. 1987. Managerial perspectives on risk and risk taking. *Management Science*, 33: 1404-1418.
- March, J. G., & Simon, H. A. 1958. *Organizations*. New York: Wiley.
- Miller, K. D., & Bromiley, P. 1990. Strategic risk and corporate performance: An analysis of alternative risk measures. *Academy of Management Journal*, 33: 756-779.

- O'Brien, P. C. 1988. Analysts' forecasts as earnings expectations. *Journal of Accounting and Economics*, 10: 53–83.
- SAS Institute. 1984. *SAS/ETS user's guide*, version 5 ed. Cary, NC: SAS Institute.
- Schon, D. A. 1971. *Beyond the stable state*. New York: Norton.
- Silhan, P. A., & Thomas, H. 1986. Using simulated mergers to evaluate corporate diversification strategies. *Strategic Management Journal*, 7: 523–534.
- Simon, H. A. 1976. *Administrative behavior* (3d ed.). New York: Free Press.
- Singh, J. V. 1986. Performance, slack, and risk taking in organizational decision making. *Academy of Management Journal*, 29: 562–585.
- Staw, B. M., Sandelands, L. E., & Dutton, J. E. 1981. Threat-rigidity effects in organizational behavior: A multilevel analysis. *Administrative Science Quarterly*, 26: 501–524.
- Thompson, J. D. 1967. *Organizations in action*. New York: McGraw-Hill Book Co.
- Woo, C. Y., 1987. Path analysis of the relationship between market share, business-level conduct and risk. *Strategic Management Journal*, 8: 149–168.

Philip Bromiley (Ph.D., Carnegie-Mellon University) is an associate professor in the Department of Strategic Management and Organization at the Curtis L. Carlson School of Management, University of Minnesota. His research interests include the influence of organizational decision processes on strategic choice, corporate risk taking, and transactions cost economics in environments with trust.

ORGANIZATIONAL INFORMATION PROCESSING, COMPETITIVE RESPONSES, AND PERFORMANCE IN THE U.S. DOMESTIC AIRLINE INDUSTRY

KEN G. SMITH

CURTIS M. GRIMM

MARTIN J. GANNON

University of Maryland at College Park

MING-JER CHEN

Columbia University

This study investigates how firms build competitive advantage by focusing on the actions and responses of rivals in the U.S. domestic airline industry. We identified four attributes of competitive response—imitation, likelihood, lag, and order—explaining them in terms of the information represented in the type of action to which a firm is responding and the information-processing characteristics and capabilities of the responding firm. We tested the importance of response as it relates to competitive advantage by linking response with performance. Findings supported the notion that a firm's response can be predicted from the manner in which it interprets and processes information. Further, three of the four response characteristics were related to performance.

Competitive interaction is a fundamental element of strategic management (Porter, 1980), and many strategy researchers have studied various aspects of this topic (e.g., Caves & Porter, 1977; Hambrick, 1983; Harrigan, 1980, 1982, 1985; Porter, 1980, 1985). Although such exploration has added to our understanding of competitive interaction, the methods and models of this investigation have largely been coarse-grained (Harrigan, 1983) and static (Porter, 1981). Consequently, the dynamic features of competitive interaction and, more specifically, the means by which firms build competitive advantage have remained largely hidden and unexplored.

This study investigated how firms build competitive advantage by focusing on the specific actions and responses of competitors. The spotlight on actions and responses is consistent with the perspective of strategy researchers who have recently advocated a more fine-grained and dynamic view of competition (Bettis & Weeks, 1987; Chen, 1988; MacMillan, McCaffrey, &

Thanks are due to Edwin Locke, Henry Sims, and two anonymous reviewers for their helpful comments on an earlier draft of this article. We are also grateful to the Computer Science Center at the University of Maryland for providing the computer time for data analysis.

Van Wijk, 1985; Smith, Grimm, Chen, & Gannon, 1989). This orientation is also consonant with Caves's (1984) call for the study of "rivalrous moves among incumbent producers," and it follows Porter's (1980) definition of strategy as the undertaking of competitive moves to achieve competitive advantage.

However, the present research offers a significant improvement over the very few and limited past studies of actions and responses by providing a rigorous test of specific hypotheses. Previous research, although contributing to strategic management theory, has been based on either limited case studies involving a single set of competitors (e.g., Bettis & Weeks, 1987), or retrospective reports of key industry participants (e.g., MacMillan et al., 1985; Smith et al., 1989). The present research used a large data set comprised of 418 competitive responses to 191 competitive actions over an eight-year period in the U.S. domestic airline industry.

The purposes of the study were to test hypotheses predicting competitors' responses and to link variations in response to performance. We identified four important attributes of response—imitation, likelihood, lag, and order—explaining them in terms of (1) the signal, or information represented, in the type of action to which a firm is responding and (2) the information-processing characteristics and capabilities of the responding firm. We related importance of response to competitive advantage and tested it by focusing on its link to performance.

ACTIONS AND RESPONSES

Our attention to actions and responses is rooted in the writings of Schumpeter (1934, 1950). Schumpeter viewed a market as a mechanism that lets firms experiment by taking specific actions; some firms undertake actions in an attempt to lead, and others follow and imitate. Firms successful in carrying out leadership actions, or seizing opportunities, reap profits because they occupy a monopolistic position until they are imitated (Nelson & Winter, 1982). However, a long-term equilibrium is never reached. The excess profits of the acting firms and the losses and lost opportunities experienced by the nonresponders motivate the latter to respond and imitate the actions.

Consistent with Schumpeter's analysis, we defined an action as a specific and detectable competitive move, such as a price cut or a new product introduction, initiated by a firm to defend or improve its relative competitive position. Similarly, a response is a clear-cut and discernible counteraction taken by a competing firm with regard to one or more competitors to defend or improve its position (Porter, 1980).

Schumpeter (1934, 1950) also emphasized the importance of profits in motivating a firm to act or respond. In theory, an acting firm could earn abnormal profits through the monopolistic position (the first mover advantage) it has prior to a response. That is not to imply, however, that all actions

lead to successful outcomes or that all actions prompt a response. Rather, our argument is that when a firm's action generates above-normal economic profits, rivals will respond because they want to participate in the profits. Moreover, it is expected that as the profits derived from an action increase, so will the speed and number of responders who will attempt to mimic or duplicate it.

Thus, firms want to take action against competitors who are unlikely to respond—who have a low response *likelihood*—or who respond slowly, demonstrating a high response *lag*. A third important dimension of action and response is response *order*, or the position in a temporal series of responses a firm occupies. Response lag and response order capture different dimensions of response. For example, a firm might take a significant amount of time to respond to an action but still be the first responder. Thus, its response lag is high but its response order is low. The final characteristic we studied concerned the type of response that is made. There are numerous ways in which firms can respond to a leader's action, but one key dimension is response *imitation*, or the degree to which a response mimics an action.

These ideas are consistent with Porter's (1980) framework for competitor analysis, in which a key element is developing profiles of the likely changes each competitor might make. For example, some firms consistently mimic a rival's actions in the marketplace and can be labeled imitators. Other firms habitually respond to all, or almost all, actions; such firms can be considered likely responders. Certain firms selectively respond but always respond very slowly, lagging in their responses. Finally, a few competitors might consistently be first, later, or last to respond.

Given the theorized importance of response, it is relevant to ask what factors influence response as measured by these four characteristics. Following Porter's (1980) ideas on response profiles, we predicted response on the basis of the manner in which a responding firm processes information, both in the detection of a competitor's action and the implementation of a response.

ORGANIZATIONAL INFORMATION PROCESSING

The theory of organizational information processing attempts to explain organizational behavior by examining the information flows occurring in and around organizations (Knight & McDaniel, 1979). Information processing incorporates such concepts as the analysis and transfer of environmental data from the boundary points of an organization to managers as they attempt to make meaningful decisions.

Thompson (1967) originated the concepts of organizational information processing, and Galbraith (1973, 1977) and Tushman and Nadler (1978) more thoroughly developed them. Numerous studies have employed some form of information processing theory to explain phenomena ranging from strategy and structure (Burns & Stalker, 1961; Egelhoff, 1982; Lawrence &

Lorsch, 1967) to group structure and decision making (Duncan, 1973; Van de Ven, Delbecq, & Koenig, 1976).¹

Following Egelhoff (1982), we used information processing as a theoretical concept to help explain relationships between measured variables and response characteristics. The information-processing dimensions we studied were the information represented by the type of a competitor's action, the sensory systems of responding firms, their information-processing and analyzing mechanisms, and their decision-making processes.²

The Relationship Between Information Processing and Competitive Response

Type of action. A competitor's action carries a message, expressed or implied, that other firms must evaluate and process in order to compete successfully. For example, a significant across-the-board price cut by a major airline is a fairly broad action affecting many rivals. Rivals can readily determine the intent of such an action as aggressive and predict its consequences fairly easily. In contrast, if an airline merges with a small commuter airline, the purpose of the action will be more difficult for rivals to determine and its market consequences more uncertain.

From a strategic management perspective, the information carried in a competitor's action can lead to an opportunity or to a threat necessitating a response decision by affected firms (Huber, 1982; Huber & Daft, 1987). Porter described this form of communication as follows: "The behavior of competitors provides signals in a myriad of ways. Some signals are bluffs, some are warnings, and some are earnest commitments to a course of action. Market signals are indirect means of communicating in the market place, and most if not all of a competitor's behavior can carry information that can aid in competitor analysis and strategy formulation" (1980: 75). Competitive actions and the information they convey can take many forms, but one important distinction among them is whether they are "strategic" or "tactical" (Egelhoff, 1982; Porter, 1980, 1985; Smith & Grimm, 1987). Strategic actions involve significant commitments of specific, distinctive resources and are difficult to implement and reverse; a major change in the definition of a business is an example (Galbraith & Kazanjian, 1986). Tactical actions, on the other hand, are often designed to fine-tune strategy; they involve fewer and more general resources than strategic actions, are easier to implement, and are often more reversible. Examples include price cuts and new advertising promotions.

Since strategic actions involve significant commitments of specific, distinctive resources, the information contained in these actions will be diffi-

¹ For a complete review of organizational informational theory, see McPhee and Tompkin (1985) or Jablin, Putnam, Roberts, and Porter (1987).

² It is conceivable that industry structure may directly or indirectly affect response, but we did not investigate that issue here; instead, we held industry structure constant.

cult for rivals to interpret, understand, and duplicate. Accordingly, such actions will present significant challenges for responders. First, firms will be less likely to respond to strategic actions than to tactical actions because the information contained in the former may, at least initially, be unfamiliar and uncertain. For example, when a competitor introduces a new product, it is often unclear how successful and how threatening the product will be. Thus, firms may prefer to take a wait-and-see attitude until information becomes more certain. Therefore, if a response to a strategic action occurs, there will be relatively fewer and slower responders than there would be to a tactical action. Second, since strategic actions involve significant commitments of distinctive resources, rivals will have greater difficulty arranging the necessary resources to imitate or duplicate the action.

In contrast, firms will be more familiar with the information contained in tactical actions involving general resources and they will likely have past experiences on which to base a response decision. For example, tactical pricing actions are a common occurrence in most industries, and managers can develop experience in responding to them. Accordingly, rivals will be more likely to respond and on the average will be more capable of responding quickly to tactical actions than to strategic actions. Moreover, since tactical actions involve general resources, competitors will find them easier to imitate. Thus, there will be more responders to tactical actions than to strategic actions, and a given firm will have less opportunity to be the first among a group of responders to respond. The overall hypothesis is

Hypothesis 1: The degree to which a firm pursues strategic actions will be negatively related to rivals' propensity to imitate, likelihood of response, and average response order and positively related to their average response lag.

Sensory systems. A response cannot occur if a firm or decision maker does not realize that a competitor has made a move. Hence, sensory or sensing systems are of vital concern to the quality and speed of decision making (Dollinger, 1984; Wilensky, 1967). Organizations vary significantly in their ability to sense environmental changes. For example, Miles and Snow (1978) characterized defenders as "internals" with a greater orientation toward efficiency and inner operations. In contrast, they describe prospectors as "externals" with a strong orientation toward environmental openness and change; numerous marketing and customer relations employees (Miles & Snow, 1978) and boundary-spanning activities (Adams, 1976) will characterize such firms. Thus, firms with an external orientation will be more open and more likely to sense a rival's actions than those with an internal orientation.

In addition, firms with an external orientation will be more capable of implementing competitive responses than those with an internal orientation. For instance, firms with extensive marketing and customer relations capacities will be in a better position to carry out a price cut or new product introduction than firms with fewer employees in those areas. Firms lacking

an external orientation will not be as able as those with such an orientation to sense relevant information in their environments, and they will be less capable of implementing an external response (Pearce, 1983; Pfeffer, 1972; Schoenbauer, 1972). Accordingly, we expected that a company with a strong external orientation will be more likely to respond than other firms, on the average will respond more swiftly, and will respond earlier than its rivals.

Firms with an external orientation will not only acquire information sooner than those with an internal orientation but will also be capable of gathering a richer array of information (Aldrich, 1979). Previous research has defined information richness as the information-carrying capacity of data: some data are extremely informative but others provide little understanding (Daft & Lengel, 1984). Externally oriented firms with a richer array of competitor information than internally oriented rivals will be more capable of developing, analyzing, and evaluating response options. In contrast, internally oriented firms must base their responses on information that has a low carrying capacity and provides few opportunities for understanding and little meaning (Huber & Daft, 1987). Daft and Lengel described how low information richness can lead to oversimplification and the "mindless reduction of unequivocalty" (1984: 212). Therefore, internally oriented firms will be more likely to follow and imitate the actions of rivals than externally oriented firms. Overall, the above logic suggests that

Hypothesis 2: An external orientation is positively related to likelihood of response and negatively related to propensity to imitate, average response lag, and average response order.

Information processing and analyzing mechanisms. An organization is likely to respond slowly and later than others if it does not have the mechanisms to analyze and transfer information from its external environment to decision makers and back to response implementors. The structure of an organization tends to be a major influence on its information capacity and analyzing mechanisms (Galbraith, 1977). Structure, of course, can include many dimensions, but one critical aspect relating directly to the flow of information is structural complexity, which refers to the number of organizational levels and departments an organization has relative to total size (Bedeian, 1984; Jablin, 1987; Miles, 1980; Zey-Ferrell, 1979).

Numerous studies have shown that, as structural complexity increases, so does the probability that the information being transmitted will be distorted or blocked totally (e.g., Aldrich, 1979; Galbraith, 1977; Rousseau, 1978). Thus, a field salesperson who has learned about a competitor's move from a customer may inform the area sales manager, who may modify, delay, or totally block the transmission of this information to the next level of the organization, and so on. Even if the information finally reaches the relevant decision maker, it may be too distorted to be useful. Increased structural complexity may similarly block the passage of information from decision makers to implementors. Thus, decision makers in structurally complex

firms will receive information on competitors late and receive less rich information with which to develop response alternatives. Hence, decision makers will have difficulty responding, and when they respond they will respond slowly and later than those in structurally simpler firms. With less rich information, decision makers will tend to oversimplify and prematurely close off options. Such firms will be more likely to follow and imitate the actions of rivals than less structurally complex firms. The above suggests that

Hypothesis 3: Structural complexity is negatively related to the likelihood of response and positively related to propensity to imitate, average response lag, and average response order.

Decision-making selection and retention. No matter how effectively an information system is structured, decision makers must harness the information provided and interpret it before responding. Most important, they need to evaluate the intention behind and potential consequences of each competitor's action, which are, at least initially, frequently uncertain or unknown (Barney, 1986; Nelson & Winter, 1982). This uncertainty creates problems for decision makers, so they attempt to reduce it to controllable proportions (Duncan, 1972; Galbraith, 1977). Decision makers engage in information search activities to reduce or eliminate uncertainty (March & Simon, 1958). The costs of search and the human characteristics of decision makers can influence information search.

March and Simon (1958) emphasized that information search is costly. Thus, organizational resources and capabilities can influence the speed and exhaustiveness of a decision maker's information search. We addressed the issue of resources and capabilities using the concept of organizational slack. Bourgeois defined slack as "that cushion of actual or potential resources which allows an organization to adapt successfully to internal pressures for adjustment or to external pressures for change in policy as well as to initiate changes in strategy with respect to the external environment" (1981: 30). Cyert and March (1963) noted that slack resources enhance an organization's adaptability. Thompson (1967) contended that slack protects a firm from its environment, and Chakravarthy (1982) pointed out that strategic choices are constrained when resources are low. Meyer (1982) found that organizations with slack resources responded faster and more effectively to environmental crisis than organizations with limited resources. Moreover, organizations with slack resources can afford sophisticated search activities, such as integrative computer information systems, to enhance their search processes. Further, firms with ample slack resources are more able to implement responses. For example, such firms may instantly order overtime work to hasten an implementation. Conversely, firms without those resources may have to take time to develop a resource base to finance their response. Lieberman and Montgomery (1988) argued that to follow and mimic a rival's action is generally less costly than to undertake an entirely new action; they

referred to the phenomenon as the free rider effect. Therefore, firms with little slack will be more likely, on the average, to imitate rivals' actions than firms with great slack.

Hypothesis 4a: The degree of slack a firm has is positively related to the likelihood of response and negatively related to propensity to imitate, average response lag, and average response order.

Finally, human factors can bias an information search process (Cohen, 1958; Downs, 1966; March & Simon, 1958; O'Reilly & Roberts, 1974). In particular, the education and experience levels of a firm's top management team can critically influence information search activities and thus decision making (Hambrick & Mason, 1984). Education and experience levels relate to a manager's knowledge and skill base. Highly educated managers will conduct more exhaustive information searches than less educated managers, obtaining richer information with which to make response decisions (Hambrick & Mason, 1984). The former will also be more aware of the importance of competing aggressively in a marketplace and will be more likely to have in place mechanisms for processing competitive information. Consequently, we expected educated managers to be more likely to respond and earlier to respond than less educated managers and likely, on the average, to respond quickly. Moreover, because educated managers will have a rich array of information enabling a variety of response options, they will be less likely to imitate the actions of rivals than less educated managers.

Highly experienced managers, on the other hand, will tend to employ less exhaustive search procedures than relatively inexperienced managers, often simply utilizing processes and responses that have worked well in the past (Carson, 1972). According to Hambrick and Mason (1984), managers retain their cognitive and emotional experiences during their careers. Managers with many years of experience in a single industry will thus have a limited knowledge and skill base from which to make response decisions and will be more likely to engage in limited search (Cyert & March, 1963) when faced with a competitive action. Carson asserted that experienced managers will tend to avoid risky actions and will more likely develop explicit and well-defined cognitive models that can affect their flexibility (Hitt & Barr, 1989). In contrast, less experienced managers will be more likely to engage in novel and risky actions, will have more stamina, and will be more able to learn new behaviors than highly experienced managers (Child, 1974). Therefore, we expected less experienced managers to be more aggressive and thus more likely to respond than more experienced managers. Furthermore, less experienced managers will, on the average, respond faster to a competitor's action and will respond earlier than more experienced managers.³ Because they will tend to be risk takers, less experienced man-

³ Although it could be argued that exhaustive search procedures employed by less experienced managers would delay response, the aggressiveness factor is expected to outweigh the time delay extensive search may cause.

agers will also be more likely not to mimic the actions of rivals. The above suggests that

Hypothesis 4b: Low levels of experience and high levels of education among the managers on a top-level team are positively related to likelihood of response and negatively related to propensity to imitate, average response lag, and average response order.

Competitive Response and Performance

Our final hypothesis relates the four response characteristics to the performance of a responding firm. Earlier, we argued that acting firms build an advantage by executing actions that delay response. However, the opposite argument can be used to posit an advantage for a responding firm. A firm's response profile as measured by imitation, likelihood, lag, and order can signify the extent of its combativeness in the marketplace (Porter, 1980). For example, nonimitative, likely, fast, and first responders can be considered aggressive competitors whereas imitative, unlikely, slow, and late responders can be viewed as nonaggressive.

If a firm judges that a rival's action will lead to above-normal profits, a response may be necessary (Nelson & Winter, 1982). Moreover, as the acting firm is interested in delaying response, an aggressive response may be imperative to the advantage and longevity of a responding firm. An aggressive response may allow the responding firm to participate in a quasi-monopoly with the actor. Lieberman and Montgomery (1988) suggested that by responding quickly to an initial action, a "fast-second" firm can avoid the risks of acting first yet share the market with only one competitor, the actor.

An aggressive response can also lead to advantage for a responding firm by blocking the success of a competitor's action (Porter, 1980). For example, in the retail coffee business, Maxwell House mounted a quick response to the entry of Proctor and Gamble, causing the latter to reconsider its strategy in the coffee industry. Failure to quickly block a competitor's action can lead to the construction of barriers that will be difficult and expensive for any responder to overcome later. In addition, an aggressive response can effectively shape the information and assumptions of actors (Porter, 1980). Thus, when Nestlé test-marketed its New Cookery line in several markets, competitors quickly responded by lowering prices, distorting all of Nestlé's market data. An aggressive response serves to signal rivals of a responding firm's aggressive intentions, which may lead to a more cooperative relationship at a later date (Porter, 1980).

Although an aggressive response may prove crucial to the outcome of a competitive battle, simply following and imitating an action sometimes serves only to intensify competition (Porter, 1980).⁴ Hence, an important

⁴ The traditional game theory model, in which the position of both competitors worsens through a response that simply imitates the action, exemplifies that pattern (cf. Sherer, 1980).

challenge for an aggressive responder is the development of a creative response that takes away the first mover's advantage without exactly duplicating the action. Therefore, although all responses are important, nonimitative responses should be associated with higher levels of performance than imitative responses.

Hypothesis 5: Likelihood of response is positively related to performance; propensity to imitate, average response lag, and average response order are negatively related to performance.

Table 1 summarizes the hypotheses tested in this study.

METHODS

The method used in this study was structured content analysis (Jauch, Osborn, & Martin, 1980). We identified a series of important competitive events from an eight-year review of each issue of *Aviation Daily* and used a predesigned, structured coding schedule to analyze the content of each event. As no previous research has employed this methodology to analyze competitive interaction, we discuss specific aspects of the method, including selection of an industry, sources of action and response data, procedures for identifying actions and responses, and treatment of industry segmentation.

The U.S. domestic airline industry was selected for study because of its acknowledged competitiveness, well-known set of competitors, and clearly defined boundary; in addition, a rich source of information on the industry is publicly available. We defined the domestic airline industry as including all major airlines with annual operating revenues over \$100 million. Important competitive events in the resulting 32-member industry over an eight-

TABLE 1
Summary of Hypotheses

Hypotheses	Response Imitation	Response Likelihood	Response Lag	Response Order
Hypothesis 1				
Proportion of responses to strategic actions	Negative	Negative	Positive	Negative
Hypothesis 2				
External orientation	Negative	Positive	Negative	Negative
Hypothesis 3				
Structural complexity	Positive	Negative	Positive	Positive
Hypothesis 4a				
Slack	Negative	Positive	Negative	Negative
Hypothesis 4b				
Managers' education	Negative	Positive	Negative	Negative
Managers' experience	Positive	Negative	Positive	Positive
Hypothesis 5				
Performance	Negative	Positive	Negative	Negative

year period, from January 1979 to December 1986, provided data for the current research.

The primary source of data on actions and responses was *Aviation Daily*, an industry journal with a 50-year history. A comprehensive investigation of *Aviation Daily* revealed that it had complete and detailed information suitable for the purposes of this study, presented unbiased and representative reporting of competitive events, was not susceptible to the potential financial influences of large airlines since it did not solicit their advertisements, and did not need to create only newsworthy stories—for example, by only writing about the best-known firms—as a periodical marketed to the general public might. The investigation of *Aviation Daily* included extensive comparison of the journal with other publications, from general business publications like the *Wall Street Journal*, *Business Week*, and *Fortune* to industry-specific publications such as *Aviation Week and Space Technology*, *Air Transport World*, and *Airline Executive*; interviews with *Aviation Daily* officials; and interviews with chief executive officers and members of the boards of directors of domestic airlines. *Aviation Daily* is an industry publication to which members of the industry, including consultants, brokers, and suppliers, subscribe on a yearly basis.⁵ Other publications seem to merely duplicate the information found in *Aviation Daily*.

Data were gathered through identification of actions and responses, which in combination we refer to as competitive events. As noted earlier, an action was defined as a specific market move, such as a price cut, a market expansion, or a special promotion. A response was also a market move, one taken by a competing firm to counteract an initial competitive action. We considered competitive actions significant and important if they were mentioned in *Aviation Daily* and were counteracted by at least one competitor. We identified responses by a key word search of each issue of *Aviation Daily*. Key words included “in responding to . . .,” “following . . .,” “under the pressure of . . .,” “reacting to . . .,” and so forth. For example, *Aviation Daily* reported that “Under the pressure of American Airlines’ planned hub creation, Piedmont revealed a statewide expansion program in Florida” (July 10, 1985), so we identified Piedmont’s Florida expansion as a response to American Airlines’ hub creation.

A rigorous procedure of tracing strings of actions and responses to identify initial actions was followed. We began by examining each issue of *Aviation Daily*, beginning with the last day of 1986. Employing the key word method, we identified responses and traced back, day by day, over the eight years, to find the reporting of the initial action. For example, if on October 3, 1983, People’s Express opened a new gate in response to Eastern’s September 1 gate-opening announcement, we labeled Eastern the actor and People’s Express the responder. That would constitute a competitive event with

⁵ *Aviation Daily*’s circulation is 36 percent air carriers, 32 percent air services and financial organizations, 21 percent air equipment manufacturers and distributors, and 11 percent government and airports.

one actor and one responder. If later *Aviation Daily* reported that American reacted to Eastern's gate opening on November 25 by changing its route structure, we identified American as the second responder, behind People's Express. Thus, the method identifies first actors and all responders in their order of response to an initial action.

A total of 191 competitive actions and 418 responses were identified over the eight-year period. To confirm the validity of this procedure, we constructed a random sample of 20 events and verified it using other major business publications. Of the 20 events, only 3 could not be completely confirmed, presumably because the reporting of airline events in other major press outlets was much less comprehensive than that in *Aviation Daily*.

Finally, market segmentation had methodological implications. The airline industry serves a number of different geographic markets. With regard to the measurement of imitation, lag, and order, the segmentation of the industry posed no problem because our method automatically selected segments in which airlines were competing with one another; if a firm responds to another's actions, the two are clearly competitors. For example, response lag for Northwest Airlines reflects the average speed of the company's response to actions in segments in which it competes.

However, it was important to account for market segmentation in the response likelihood measure. Each airline competes in a selected set of geographic markets, with some airlines, such as United, present in almost every market and others, such as America West, focused regionally. Thus, if United lowers prices only in its eastern routes, America West is unlikely to respond. Accordingly, we delineated the specific domestic airlines in the market affected by each competitive action. When measuring response likelihood for each airline, we considered the number of times competitive actions occurred in that airline's markets, so the measure reflects the absolute number of actions to which a competitor would have had a need or opportunity to respond. We discuss this measure in more detail below.

Measures

Response variables. Average year-end organizational response scores were calculated for each of the four response attributes for each responding firm; thus, the unit of observation was a firm's responses over a given year, an appropriate unit for several reasons. First, using average year-end response scores accounts for the interdependence inherent in a single firm's responses during a given year (Glick & Roberts, 1984).⁶ Further, this approach is conceptually consistent with the stated hypotheses and Porter's (1980) notion of response profiles. The four average response measures provide a portrait of each organization's typical response behavior during a given year. Finally, aggregation of response behavior in a given year is nec-

⁶ Statistically, the variance between organizations and across time on each of the response measures is significantly greater than the variation within organizations and within given years.

essary for consistency with organizational and performance data, which are available only for whole years. The alternative to this procedure would have been to use each competitive event as a unit of analysis. However, we would have then had to duplicate annual organizational and performance data to match each event of a given year. Although doing so would have significantly added to the number of cases, as Glick and Roberts pointed out, "all reported significant tests would be overly liberal" (1984: 725). Thus, we tested the hypotheses with yearly average response scores, arguably a conservative approach.

Response likelihood was calculated by summing the number of times each airline responded to competitors' actions during a given year and dividing that figure by the number of times the firm had an opportunity to respond. For example, if American Airlines responded to 12 actions in 1983 and 2 actions in 1984 and had opportunities to respond to 24 actions in 1983 and only 20 actions in 1984, its response likelihood would be .50 in 1983 and .10 in 1984. Consequently, firms that score high on this scale are likely responders. To measure opportunities to respond, we counted the number of actions that potentially affected a focal airline, airport-by-airport, with no double counting. For example, in the case of a price cut targeted at airports in the Northeast, only airlines responding at those airports would have an opportunity or sense a need to respond, and we would count all such airlines.

Response imitation, or the degree to which a response imitated an action, was measured in terms of the concurrence of the type of action and the type of response. We captured the degree of duplication involved in each response with a binary variable, with a value of 1 when the type of response was the same as the type of action—for example, a price cut in response to a price cut—and a value of 0 when the types differed, as when a firm cut prices in response to a new product introduction. We averaged these values for each airline for each year to obtain an imitation score. A high score indicated that an airline had a propensity to mimic or duplicate a competitor's action, a low score, the opposite.

Response lag was measured by the amount of time it took a firm to respond to a competitor's action. The amount of time was measured by the difference between the data of the first report of a specific competitive action in *Aviation Daily* and the date a response was reported. We used average response lags, calculated by averaging the amounts of time it took a given airline to respond to competitors' actions for each year. Thus, if Piedmont Airlines responded 4 times in 1982 at intervals of 10, 12, 14, and 16 days, its average response time for 1982 would be 13 days.

Response order was measured as the rank position in time of a responding firm among all responders, calculated by averaging each airline's actual rank position in the order of responders for each action for each year. For example, if United Airlines responded to three actions in 1985, and its order of response to these actions was second, fourth, and sixth, its average response order for 1985 would be fourth.

A pooled cross-sectional time series data set was thus constructed containing 104 observations for each of the response characteristics. These 104 observations are based on the responses of 23 different airlines. We excluded firms that did not respond from the analysis.

Type of action. The 191 actions were comprised of 16 different action types, ranging from new product offerings, mergers, and new hub creations to price cuts, new promotional campaigns, and joint advertising efforts. These different types of action were classified as strategic or tactical by six professors with expertise in the airline industry. There was 98.9 percent agreement among the judges in the classification of these types into the two categories, with only one incidence of disagreement. Of the actual observations, we classified 158 as tactical and 33 as strategic. We then measured the proportions of the relative responses to strategic and tactical actions for each organization for each year. Specifically, we divided the number of times a firm responded to a strategic action in a given year by its total number of responses. For example, if a firm responded to 12 actions in a year and three of those responses were to strategic actions, its score would be .25; its tactical score would automatically be .75.

Organizational information-processing variables. It is often difficult to find objective measures that will precisely fit diverse theoretical concepts (Harrigan, 1983). Accordingly, we examined a wide variety of publicly available data on airlines and used our judgment in selecting measures reflecting the constructs of interest. To the extent possible, we gathered multiple measures, standardized them, and combined them into scales.

The externality of a firm's orientation was inferred from how many of its vice presidents were in marketing and customer relations, with information drawn from the *World Aviation Directory*. Adams (1976) specifically identified marketing and customer relations as key external boundary areas, and Miles and Snow (1978) related these areas to firms' external orientations. We summed the two measures to form a single scale labeled external orientation ($\alpha = .68$).

Following Bedeian (1984) and Jablin (1987), we defined structural complexity as the number of separate parts in an organization reflected by the number of levels and departments, with size controlled. We thus obtained the total number of departments and the total number of officers in each company from *World Aviation Daily* and divided each by organizational size. We measured size by total revenue passenger miles, or the total number of miles an airline's passengers travel, excluding those passengers who do not generate revenue, such as airline employees. We then standardized and summed the two totals into a single scale, structural complexity ($\alpha = .76$).

As did Singh (1986), we measured two components of organizational slack: absorbed slack and unabsorbed slack. Absorbed slack was the amount of selling, general, and administrative expenses divided by total revenue, a measure reflecting slack that is absorbed by costs. Unabsorbed slack was measured by the extent to which current liabilities covered the sum of cash and marketable securities for a year. This measure, the quick ratio, reflects a

company's uncommitted liquid resources. We obtained information on airlines' annual expenses from *Air Carrier Financial Statistics* and took information for the unabsorbed measure directly from Standard and Poor's COMPUSTAT tapes. We assumed that airlines with little slack would have fewer resources with which to engage in information search activities than those with much slack.

Each airline's top management team was defined as all corporate executives listed in the *Dun and Bradstreet Corporate Directory*. We gathered data on the educational levels and years of industry experience of the chief executive officer and seven other randomly chosen corporate executives for each airline for each year (an average of 22 corporate executives were listed in the *Dun and Bradstreet* directory for each airline). These data were averaged.

Performance. Performance was measured in terms of net profit after taxes divided by total revenue. Data for this profitability measure came from *Air Carrier Financial Statistics*. Profitability has been the dominant measure of performance in strategy research (Hofer, 1983).

RESULTS

Table 2 reports means and standard deviations and the correlations between the major variables in this study. It is to be noted that there is some degree of correlation among the four response variables. As response likelihood increases, imitation increases ($r = .22, p < .01$) and lag decreases ($r = -.23, p < .01$). In addition, response order and imitation are positively related, suggesting that late responders tend to be imitators ($r = .30, p < .001$). Not surprisingly, order and lag are positively correlated ($r = .22, p < .01$).

Regression models were used to test the first four hypotheses. A separate regression model was run for each dependent variable, imitation, likelihood, lag, and order (Table 3). Because of the potential problem of serial correlation with time series data, we calculated a Durbin-Watson test statistic for each regression equation (Neter & Wasserman, 1974). For the equations predicting imitation, lag, and order, there was no indication of serial correlation; the Durbin-Watson test statistics were 2.00, 1.89, and 2.02, respectively. In the regression equation with response likelihood as the dependent variable, the Durbin-Watson test yielded a value of 1.53—indeterminate with regard to the existence of serial correlation. Following procedures employed by Harrigan (1982), we used a generalized-least-squares technique. First, we estimated the serial correlation present in the data from the initial ordinary-least-squares equation. We then applied generalized differencing corrections to all the variables and estimated the second equation. Pindyck and Rubinfeld (1981) provide full details of the procedure. A test statistic from the generalized-least-squares equation of 2.01 indicated no serial correlation; the generalized regression results for response likelihood did not differ substantially from the least-squares results.

Table 3 reports the regression coefficients used to test the hypotheses

TABLE 2
Means, Standard Deviations, and Pearson Correlation Coefficients of Major Variables^a

Variables	Means	s.d.	1	2	3	4	5	6	7	8	9	10	11
1. Proportion of responses to strategic actions	0.09	0.20											
2. External orientation	0.18	0.05	-.16*										
3. Structural complexity	0.01	0.95	.15	-.15									
4. Absorbed slack	0.95	0.13	-.10	.04	.18*								
5. Unabsorbed slack	0.37	0.35	.14*	.07	.08	-.20**							
6. Management's years of education	16.46	1.02	.03	-.05	-.15	-.06	.09						
7. Management's years of experience	24.65	5.65	-.10	-.12	-.10	-.06	-.33***	-.25***					
8. Response imitation	0.82	0.31	-.11	-.01	-.17*	.03	-.34***	.22**	-.09				
9. Response likelihood	0.22	0.19	-.09	.22**	-.41***	-.08	-.14	.12	.15	.22**			
10. Response lag	13.99	17.18	.33***	-.35***	.03	-.15	.06	-.06	.10	-.06	-.23**		
11. Response order	2.56	1.75	-.25***	-.17*	.13	.16*	-.19*	-.16*	.25***	.30***	-.12	.22**	
12. Profitability	-.03	0.15	.09	.04	-.12	-.94***	.14	.10	.06	-.01	.13	.11	-.20**

^a N = 104.

* $p < .05$

** $p < .01$

*** $p < .001$

TABLE 3
Results of Regression Analyses Testing Hypotheses 1, 2, 3, 4a, and 4b^a

Variables	Response Imitation		Response Likelihood ^b		Response Lag		Response Order	
	β	s.e.	β	s.e.	β	s.e.	β	s.e.
Proportion of responses to strategic actions	-.039	.094	.042	.094	.265**	.094	-.286**	.093
External orientation	.005	.094	.232**	.101	-.320**	.092	-.168*	.093
Structural complexity	-.097	.097	-.310***	.101	-.045	.095	.141†	.096
Absorbed slack	-.004	.096	-.134†	.101	-.120†	.093	.096	.095
Unabsorbed slack	-.341**	.100	-.085*	.101	.043	.098	-.056	.099
Management's years of education	.241**	.096	.013	.096	.071	.094	-.089	.096
Management's years of experience	.031	.102	-.203**	.100	.041	.100	.213**	.101
Adjusted R ²	.19		.22		.23		.21	
F	3.35***		3.73***		4.11***		3.72***	

^a N = 104.

^b We used generalized-least-squares regression equations corrected for serial correlation.

† $p < .10$

* $p < .05$

** $p < .01$

*** $p < .001$

and representing the relationship between the predictor variable and the dependent variable with the other independent variables held constant. Some support for the hypothesized relationship between type of action and response emerged. Airlines responded more slowly to strategic actions than to tactical actions ($\beta = .27, p < .01$). There were also more responders to tactical actions ($\bar{x} = 2.40$) than to strategic actions ($\bar{x} = 1.15$), and that difference directly explains why firms responding to strategic actions had lower response-order scores ($\beta = -.29, p < .01$). None of the other response variables are significantly related to type of action.

There is also support for Hypothesis 2. As predicted, externality of orientation is positively related to response likelihood ($\beta = .23, p < .01$) and negatively related to lag ($\beta = -.32, p < .01$) and order ($\beta = -.17, p < .05$). As a firm's external orientation increases, the likelihood of response increases and response lag and order decrease. There is thus no support for the response imitation portion of the hypothesis.

There is partial support for Hypothesis 3. As structural complexity increases, response likelihood decreases ($\beta = -.31, p < .001$). Moreover, structural complexity is positively related to response order; however, that relationship is only marginally significant ($\beta = .14, p < .10$). No support emerged for other parts of Hypothesis 3.

There are differing levels of support for aspects of Hypothesis 4a, which concerns organizational slack and response. As predicted, unabsorbed slack is negatively related to response imitation ($\beta = -.34, p < .01$). However,

opposite the hypothesized relationship, unabsorbed slack is negatively related to response likelihood ($\beta = -.09, p < .05$). There is also a negative, but only marginally significant, relationship between absorbed slack and response lag ($\beta = -.12, p < .10$). This result was unexpected, since firms with high absorbed slack have few extra resources to apply to a fast response. No support emerged for the other hypothesized relationship concerning response order.

Finally, there is partial support for Hypothesis 4b. Contrary to expectations, organizations managed by highly educated teams were more likely to imitate the actions of competitors ($\beta = .24, p < .01$). Years of education were unrelated to the remaining response variables. However, as expected, management teams with fewer years of experience were more likely to respond ($\beta = -.20, p < .01$) and to respond early than more experienced teams ($\beta = .21, p < .01$). Years of experience is unrelated to response imitation and response lag.

Overall, the seven independent variables account for 19 percent of the variation in response imitation ($F = 3.35, p < .001$), 22 percent of the variation in response likelihood ($F = 3.73, p < .001$), 23 percent of the variation in response lag ($F = 4.11, p < .001$), and 21 percent of the variation in response order ($F = 3.72, p < .001$).

Table 4 reports the regression analysis results pertaining to performance. Overall, these results are mixed. There is a positive, but only marginally significant, relationship between response likelihood and profitability ($\beta = .13, p < .10$) and a negative relationship between response order and profitability ($\beta = -.23, p < .05$). Contrary to expectation, as response lag increased, profits increased ($\beta = .20, p < .05$). Response imitation was unrelated to profits.

The four response characteristics account for 8 percent of the variation in profitability ($F = 2.11, p < .10$). The low R^2 is not unusual for cross-sectional studies, in which many unobserved variables may influence performance (Harrigan, 1982).

TABLE 4
Results of Regression Analysis Testing Hypothesis 5

Variables	Profitability	
	β	Standard Error
Response imitation	.037	.106
Response likelihood	.129†	.103
Response lag	.197*	.102
Response order	-.225*	.107
Adjusted R^2	.08	
F	2.11†	

† $p < .10$

* $p < .05$

** $p < .01$

DISCUSSION

The purpose of this study was to test hypotheses predicting competitive responses and to link variation in response to performance. With regard to predicting response, over 46 percent of the relationships were statistically significant at a 10 percent level or better. Moreover, two-thirds, or 67 percent, of the response characteristics were statistically related to performance, also at a 10 percent level or better. Thus, there was general support for the theory of the determinants of response and for the link between response and performance. This support is particularly encouraging given that this is the first large-scale empirical study of competitive responses.

The primary value of this research is that it contributes to our understanding of the dynamic features of competitive interaction. In particular, the results offer insight into how firms act and respond in the marketplace. Concerning the link between type of action and response, the results imply that firms respond faster to tactical actions than to strategic actions. The information contained in strategic actions is probably much more difficult for rivals to interpret than that contained in tactical actions. Nevertheless, it was disappointing that type of action was not a better predictor of response, although type of action did predict response lag. This lack of support for our predictions may be attributable to the broad-based, year-end measure we employed, namely, the proportions of responses to strategic and tactical actions. Future research should investigate the characteristics of competitive actions in more detail, examining, for example, their magnitude, scale, and potential, and should also break down types of actions more specifically. Such research would have important implications for managers seeking actions to which response is very difficult.

With reference to information processing characteristics and response, the results contribute to our understanding of how firms build competitive advantage by suggesting that firms with many marketing and customer service employees (high externality) will be early responders and more likely and faster responders than companies with low externality. Such firms will tend to have more and richer information on competitors' actions because they can sense and interpret their competitive environment. We speculate that other externally oriented activities, such as attending trade shows, will confer similar information advantages.

The results related to structural complexity suggest that specialization (part of the measure of complexity) may not be helpful in responding to such environmental changes as actions by competitors. Perhaps firms need to find mechanisms to harness the advantages of complexity or need to strive instead for structural simplicity.

The findings on slack are interesting. The negative relationship between unabsorbed slack and response likelihood suggests that firms with unabsorbed slack may consider it a buffer between themselves and environmental changes and thus sense little pressure or need to respond to such changes.

The negative relationship between absorbed slack and response lag may be a little more complex than we assumed. For example, absorbed slack includes costs related to marketing and to the number of customer relations vice presidents employed, the measure of external orientation. As a result, firms may invest some absorbed slack in mechanisms that help them respond quickly by helping them obtain more and richer information.

The finding on management experience evokes an image of novice management teams attempting to be forceful in the marketplace. Perhaps inexperienced managers are more sensitive to environmental changes or more capable of creating organizational change than experienced ones.

Concerning the link between response and performance, the results emphasize the importance of responding ahead of rivals: with early response, profitability increases. However, the positive relation between response lag and profitability is somewhat contrary to this conclusion. But by including both response order and lag in the same regression equation (see Table 3), we captured the importance of speed, controlling for response order. Thus, it is likely that response order and lag work together. Responding fast and early may be an inefficient use of resources if the key is responding ahead of rivals. Similarly, responding fast but late may serve no useful economic purpose. It may be that the longer a firm can delay a response but yet respond ahead of rivals, the more time it has to develop an effective response.

Contrary to expectations, response likelihood was only marginally related to performance, and response imitation was unrelated to it. Perhaps response likelihood is material to performance only under certain industry conditions, such as the presence of many competitors. In addition, one factor that may have limited the imitation results is the somewhat narrow definition of imitation. No doubt firms can imitate the actions of competitors in many ways other than by the type of action; for instance, the magnitude and scale of a response and the manner in which it is implemented can allow imitation. Subsequent research should investigate the context in which response occurs and attempt to broaden our definition of imitation.

Although the findings of this study are encouraging, as in any study there are limitations. One concern is that *Aviation Daily* may have misinterpreted an action as a response or the opposite. We carefully investigated this potential problem. Over 93 percent of the events reported directly listed an initial action as clearly instigating a response. In only a small number of cases, all involving five or more multiple responders, a response was linked to responding firms in addition to an initial actor. However, these were generally events of the type we called diffusion of innovation, such as the initiation of a "frequent flyer" program, where the initial actor was not in question. Thus, we deemed *Aviation Daily* a reliable source for studying competitive interaction among airlines. Nevertheless, and despite the extensive checks we made, *Aviation Daily* may miss very subtle actions or consider some actions not important enough to report.

Another important issue is the extent to which these results can be

generalized. First, it should be noted that a single-industry study is most appropriate for this kind of investigation. Using multi-industry data might introduce substantial variation in response characteristics from extraneous factors, such as differing industry maturity levels or concentration ratios. By limiting the study to a single industry, we reduced variation in response characteristics from extrinsic factors, allowing a purer test of the theory. Moreover, the information-processing and response variables used here apply to all organizations and could be similarly operationally defined for other industries. Therefore, the theory and ideas are relevant or generalizable to a wide variety of settings.

Nonetheless, the U.S. domestic airline industry does possess some distinctive features that could be germane to the study's generalizability. In particular, competitors in the airline industry have very good information about one another because of the widespread use of computer reservation systems and the existence of a special industry publication in *Aviation Daily*. However, although these information sources are somewhat unusual, information on competitors is frequently available in other industries, particularly in oligopolistic industries that largely serve consumers. For example, Coca-Cola and Pepsico are no doubt extremely knowledgeable about each other's pricing and promotion actions, and General Mills and Proctor and Gamble probably also have such knowledge. In lieu of industry magazines such as *Aviation Daily*, these firms gather competitor information through mechanisms like attending trade shows, speaking to retailers, and carefully monitoring publicly available information. Thus, we do not expect that the information-rich context of the U.S. domestic airline industry unduly influenced the tests of the hypotheses. Indeed, we speculate that in industry settings in which competitor information is not as rich and readily available, response will be less likely and slower.

The airline industry is also somewhat distinctive in that it has experienced significant turbulence as a result of deregulation. In the regulated airline environment, managers had little power to carry out simple actions such as cutting prices or creating hubs. However, their new freedom from deregulation prompted airlines to engage in significant and hostile rivalry with one another during the 1980s. Smith, Grimm, Gannon, and Young (1990) found that in industries whose managers were more experienced in competitive rivalry, the number of actions and responses was fewer and response times slower than in the airline industry.

Therefore, although the U.S. domestic airline industry is unusual in some respects, it shares characteristics with many other industries. Still, the present results should be considered preliminary and exploratory, and caution should be exercised in generalizing them to other industries.

One important area for future research involves first mover advantages (Lieberman & Montgomery, 1988), an issue that researchers investigating strategic management are debating with increasing intensity. Most of the research in this area has investigated the first entrant into an industry (Lamb-

kin, 1988; Robinson & Fornell, 1985). However, to our knowledge there has been no empirical research on the performance implications of initiating actions in ongoing competitive rivalry.

Although the current data set is limited in testing first mover benefits since it includes only first moves that evoke responses, it is interesting to compare the performance consequences of tactical and strategic actions. Given that tactical actions provoke more and faster responses, we expected the number of such actions to be negatively related to performance. Speedy responses by multiple responders could well drive down profits for all, particularly since tactical actions often involve price cuts. However, the opposite relationship was expected with strategic actions. Strategic actions evoke fewer and slower responses, so the number of such actions should be positively related to profits. To test these ideas, we calculated the number of times firms took strategic and tactical first actions in a given year, with a zero score indicating that a firm did not make any first moves, and correlated those scores with the performance measure described above. Performance decreased with first tactical actions ($r = -.14$, $p < .05$, $n = 223$). Although the sign of the coefficient was positive, there was no significant relationship between first strategic actions and performance. Certainly, these results must be considered very preliminary. However, in conjunction with this study's overall results on response and performance, they do shed initial light on the performance consequences of acting and responding in a complex dynamic context and provide some guidance as to how future research might proceed. In particular, the results suggest that the effectiveness of a first move will depend on the type of move it is and the speed and number of rival responders.

In conclusion, researchers can obtain a more complete picture of competitive interaction and advantage by focusing their attention on the specific actions and responses of firms. Such an orientation can succinctly capture the dynamics of strategy and competition and greatly enrich understanding of how firms build competitive advantage.

REFERENCES

- Adams, J. S. 1976. The structure and dynamics of behavior in organization boundary roles. In M. D. Dunnette (Ed.), *Handbook of industrial and organizational psychology*: 1175–1199. Chicago: Rand McNally Publishers.
- Aldrich, H. E. 1979. *Organizations and environments*. Englewood Cliffs, NJ: Prentice-Hall.
- Barney, J. B. 1986. Types of competition and the theory of strategy: Toward an integrative framework. *Academy of Management Review*, 11: 791–800.
- Bedeian, A. G. 1984. *Organizations: Theory and analysis* (rev. ed.). Hinsdale, IL: Dryden Press.
- Bettis, R. A., & Weeks, D. 1987. Financial returns and strategic interaction: The case of instant photography. *Strategic Management Journal*, 8: 549–563.
- Bourgeois, L. J. 1981. On the measurement of organizational slack. *Academy of Management Review*, 6: 29–39.

- Burns, T., & Stalker, G. M. 1961. *The management of innovation*. London: Tavistock.
- Carson, R. O. 1972. *School superintendents: Career and performance*. Columbia, OH: Merrill.
- Caves, R. E., & Porter, M. E. 1977. From entry barriers to mobility barriers: Conjectural decisions and contrived deterrence to new competition. *Quarterly Journal of Economics*, 91: 241–262.
- Caves, R. E. 1984. Economic analysis and the quest for competitive advantage. *Papers and Proceedings of the 96th Annual Meeting of the American Economic Association*: 127–132.
- Chakravorthy, B. S. 1982. Adaptation: A promising metaphor for strategic management. *Academy of Management Review*, 7: 35–44.
- Chen, M. J. 1988. *Competitive strategic interaction: A study of competitive actions and responses*. Unpublished doctoral dissertation, University of Maryland at College Park.
- Child, J. 1974. Managerial and organizational factors associated with company performance. *Journal of Management Studies*, 11: 13–27.
- Cohen, A. R. 1958. Upward communication in experimentally created hierarchies. *Human Relations*, 18: 41–53.
- Cyert, R. M., & March, J. G. 1963. *A behavioral theory of the firm*. Englewood Cliffs, NJ: Prentice-Hall.
- Daft, R. L., & Lengel, R. H. 1984. Information richness: A new approach to managerial behavior and organization design. In B. Staw & L. L. Cummings (Eds.), *Research in organizational behavior*, vol. 6: 191–233. Greenwich, CT: JAI Press.
- Dollinger, M. J. 1984. Environmental boundary spanning and information processing effects on organizational performance. *Academy of Management Journal*, 27: 351–368.
- Downs, A. 1966. *Inside bureaucracy*. Boston: Little, Brown & Co.
- Duncan, R. B. 1972. Characteristics of organizational environments and perceived environmental uncertainty. *Administrative Science Quarterly*, 17: 313–327.
- Duncan, R. B. 1973. Multiple decision-making structures in adapting to environmental uncertainty: The impact of organizational effectiveness. *Human Relations*, 26: 273–291.
- Egelhoff, W. G. 1982. Strategy and structure in multinational corporations: An information-processing approach. *Administrative Science Quarterly*, 17: 313–327.
- Galbraith, J. 1973. *Designing complex organizations*. Reading, MA: Addison-Wesley.
- Galbraith, J. R. 1977. *Organization design*. Reading, MA: Addison-Wesley.
- Galbraith, J. R., & Kazanjian, R. K. 1986. Strategy implementation: *Structure, systems and process*. St. Paul, MN: West Publishing.
- Glick, W. H., & Roberts, K. H. 1984. Hypothesized interdependence, assumed independence. *Academy of Management Review*, 9: 722–735.
- Hambrick, D. C. 1983. High profit strategies in mature capital goods industries: A contingency approach. *Academy of Management Journal*, 26: 687–707.
- Hambrick, D. C., & Mason, P. A. 1984. Upper echelons: The organization as a reflection of its top managers. *Academy of Management Review*, 9: 193–206.
- Harrigan, K. R. 1980. The effect of exit barriers upon strategic flexibility. *Strategic Management Journal*, 1: 165–176.
- Harrigan, K. R. 1982. Exit decisions in mature industries. *Academy of Management Journal*, 25: 707–732.
- Harrigan, K. R. 1983. Research methodologies for contingency approaches to business strategy. *Academy of Management Review*, 8: 398–405.

- Harrigan, K. R. 1985. *Strategic flexibility: A management guide for changing times*. Lexington, MA: Lexington Books.
- Hitt, M. A., & Barr, S. H. 1989. Managerial selection decision models: Examination of configural cue processing. *Journal of Applied Psychology*, 74: 53–61.
- Hofer, C. W. 1983. ROVA: A new measure for assessing organizational performance. In R. Lamb (Ed.), *Advances in strategic management*, vol. 2: 43–44. New York: JAI Press.
- Huber, G. P. 1982. Organizational information systems: Determinants of their performances and behavior. *Management Science*, 32: 572–589.
- Huber, G. P., & Daft, R. L. The information environments of organizations. In F. M. Jablin, L. L. Putman, K. H. Roberts, & L. Porter (Eds.), *Handbook of organizational communication*: 130–164. Newbury Park, CA: Sage Publications.
- Jablin, F. M. 1987. Formal organizational structure. In F. M. Jablin, L. L. Putman, K. H. Roberts, & L. Porter (Eds.), *Handbook of organizational communication*: 389–419. Newbury Park, CA: Sage Publications.
- Jablin, F. M., Putman, L. L., Roberts, K. H., & Porter, L. (Eds.). 1987. *Handbook of organizational communication*. Newbury Park, CA: Sage Publications.
- Jauch, R. R., Osborn, R. N., & Martin, T. N. 1980. Structured content analysis of cases: A complementary method for organizational research. *Academy of Management Review*, 5: 517–526.
- Knight, K. E., & McDaniel, R. R. 1979. *Organizations: An information systems perspective*. Belmont, CA: Wadsworth Publishing Co.
- Lambkin, M. 1988. Order of entry and performance in new markets. *Strategic Management Journal*, 9: 127–140.
- Lawrence, P. R., & Lorsch, J. W. 1967. *Organization and environment*. Homewood, IL: Richard D. Irwin.
- Lieberman, M., & Montgomery, D. B. 1988. First-mover advantages. *Strategic Management Journal*, 9: 41–58.
- MacMillan, I., McCaffrey, M. L., & Van Wijk, G. 1985. Competitor's responses to easily imitated new products: Exploring commercial banking product introductions. *Strategic Management Journal*, 6: 75–86.
- McPhee, R. D., & Tompkin, P. K. 1985. *Organizational communication: Traditional themes and new directions*. Beverly Hills, CA: Sage Publications.
- March, J. G., & Simon, H. A. 1958. *Organizations*. New York: Wiley.
- Meyer, A. D. 1982. Adapting to environmental jolts. *Administrative Science Quarterly*, 27: 515–537.
- Miles, R. E., & Snow, C. C. 1978. *Organizational strategy, structure, and process*. New York: McGraw-Hill Book Co.
- Miles, R. H. 1980. *Macro organizational behavior*. Santa Monica, CA: Goodyear Publishing.
- Nelson, R. R., & Winter, S. G. 1982. *An evolutionary theory of economic change*. Cambridge, MA: Harvard University Press.
- Neter, J., & Wasserman, W. 1974. *Applied linear statistical models*. Homewood, IL: Richard D. Irwin Co.
- O'Reilly, C. A., & Roberts, K. 1974. Information filtration in organizations: Three experiments. *Organizational Behavior and Human Performance*, 11: 153–265.
- Pearce, J. A. II. 1983. The relationship of internal versus external orientations to financial measures of strategic performance. *Strategic Management Journal*, 4: 297–306.
- Pfeffer, J. 1972. Size and composition of corporate boards of directors: The organization and its environment. *Administrative Science Quarterly*, 2: 281–228.

- Pindyck, R. S., & Rubinfeld, D. L. 1981. *Econometric models and economic forecasts*. New York: McGraw-Hill Book Co.
- Porter, M. E. 1980. *Competitive strategy: Techniques for analyzing industries and competitors*. New York: Free Press.
- Porter, M. E. 1981. The contributions of industrial organization to strategic management. *Academy of Management Review*, 6: 609-620.
- Porter, M. E. 1985. *Competitive advantage: Creating and sustaining superior performance*. New York: Free Press.
- Robinson, W. T., & Fornell, C. 1985. The sources of market pioneer advantages in consumer goods industries. *Journal of Marketing Research*, 22: 305-317.
- Rousseau, D. M. 1978. Characteristics of departments, positions and individuals: Context for attitudes and behaviors. *Administrative Science Quarterly*, 23: 521-540.
- Schoennauer, A. M. 1972. *The formulation and implementation of corporate objectives and strategies*. Oxford, U.K.: Planning Executives Institute.
- Schumpeter, J. A. 1934. *The theory of economic development*. Cambridge, MA: Harvard University Press.
- Schumpeter, J. A. 1950. *Capitalism, socialism, and democracy* (3d. ed.). New York: Harper.
- Sherer, F. M. 1980. *Industrial market structure and economic performance*. Chicago: Rand McNally Publishers.
- Singh, J. V. 1986. Performance, slack, and risk taking in organizational decision making. *Academy of Management Journal*, 29: 562-585.
- Smith, K. G., & Grimm, C. M. 1987. *Gambit and repartee: A theory of competitive action and response*. Paper presented at the annual meeting of the Academy of Management, New Orleans.
- Smith, K. G., Grimm, C. M., Chen, M. J., & Gannon, M. J. 1989. Predictors of competitive strategic actions: Theory and preliminary evidence. *Journal of Business Research*, 18: 245-258.
- Smith, K. G., Grimm, C. M., Gannon, M. J., & Young, G. 1990. Building competitive advantage in diverse industries. *Proceedings '90, Second International Conference on Managing the High Technology Firm*: 137-141.
- Thompson, J. D. 1967. *Organizations in action*. New York: McGraw-Hill Book Co.
- Tushman, M. L., & Nadler, D. A. 1978. Information processing as an integrating concept in organizational design. *Academy of Management Review*, 3: 613-624.
- Van de Ven, A. H., Delbecq, A. L., & Koenig, R. 1976. Determinants of coordination modes within organizations. *American Sociological Review*, 41: 322-338.
- Wilensky, H. 1967. *Organizational intelligence: Knowledge and policy in government and industry*. New York: Basic Books.
- Zey-Ferrell, M. 1979. *Dimensions of organizations: Environment, context, structure, process and performance*. Santa Monica, CA: Goodyear Publishers.

Ken G. Smith (Ph.D., University of Washington) is an associate professor of management and organization at the University of Maryland at College Park. His research interests include strategy, competitive interaction, and goal setting.

Curtis M. Grimm (Ph.D., University of California, Berkeley) is an associate professor in transportation, business, and public policy at the University of Maryland at College

Park. His research interests include competitive interaction and strategy, particularly in newly deregulated industries.

Martin J. Gannon (Ph.D., Columbia University) is a professor of management and organization at the University of Maryland at College Park. His current research and teaching interests include international organizational behavior and business strategy.

Ming-Jer Chen (Ph.D., University of Maryland at College Park) is an assistant professor of management at the Graduate School of Business, Columbia University. His current research interests include business strategy, competitive dynamics, and competitor analysis.

EFFECTS OF COMPENSATION STRATEGY ON JOB PAY DECISIONS

CAROLINE L. WEBER

Cornell University

SARA L. RYNES

University of Iowa

Previous research has revealed but not explained the occurrence of wide variations in pay for the same job, even within a single local labor market. We investigated how compensation managers from a wide variety of organizations combined information about current job pay rates, market rates, and job evaluation points to arrive at new pay rates. In addition, we examined the role of organizational pay leadership position and external or internal orientation in decisions about job pay, controlling for differences in organizational demographic characteristics. Results suggest that pay strategies affect assigned pay levels, with managers from market-leading and internally oriented firms assigning higher pay. In addition, pay strategies appear to influence the relative weights attached to market survey versus job evaluation information. Organizational demographics also affected assigned pay levels, but to a lesser extent than pay strategies.

Researchers have long recognized the existence of large differentials in pay for the same job, even in a single local labor market (Dunlop, 1957). However, the sources of these differentials are not well understood, largely because most studies of compensation differentials have focused on levels of analysis other than jobs themselves.

Economists, for example, have devoted most of their efforts to explaining individual earnings differentials, modeling these as a function of such demographic and human capital characteristics as education and experience and controlling where possible for organizational characteristics like size or

We wish to thank the American Compensation Association, Cornell University's Center for Advanced Human Resource Studies, the New York State School of Industrial and Labor Relations, and the U.S. Army Research Institute (Contract SRFC-MDA903-87-K-0001) for financial and staff support for this project. However, we retain sole responsibility for the views and findings contained herein. Thanks also to Barry Gerhart, Harry Katz, George Milkovich, Judy Olian, Vida Scarpello, Pamela Tolbert, two anonymous reviewers, and participants in research workshops at the Universities of Illinois, Iowa, and Maryland for their helpful comments on earlier versions of this article.

industry (e.g., Becker, 1964; Dunn, 1986; Mellow, 1982; Mincer & Polachek, 1974). Similarly, management and compensation specialists have focused primarily on the impact of such individual characteristics as seniority and performance level on pay allocations, particularly with respect to merit increases (e.g., Bartol & Martin, 1989; Fossum & Fitch, 1985). Members of both disciplines have modeled executive compensation levels as a function of organizational and market characteristics (e.g., Gerhart & Milkovich, 1990; Gibbons & Murphy, 1990). Economists have also examined the sources of interindustry differentials across a wide range of jobs (e.g., Dickens & Katz, 1986; Masters, 1969; Weiss, 1966). However, researchers in both economics and management have largely ignored the unique contribution of job pay decisions to individual earnings.

This is a serious omission, because job pay decisions are critical determinants of individual earnings. Research on the earnings gap between men and women has consistently revealed that differences in job placement and job pay, rather than differences in the pay individuals receive for the same job, account for the bulk of the difference in men's and women's earnings (Treiman & Hartmann, 1981). Indeed, in the few cases in which investigators have incorporated job-level data into earnings equations, job variables have completely dominated individual characteristics as sources of variance in earnings (e.g., Gerhart & Milkovich, 1989; Rosenbaum, 1985).

Job pay decisions are also important because they appear to afford considerable discretion to decision makers. The literature on pay strategies suggests that managers make conscious choices about whether their firms will lead or lag the market (Foulkes, 1980; Weeks, 1976), whether pay structures will be steep or flat (Kanter, 1987; Lawler, 1986), whether particular jobs will receive unique compensation treatment (Belcher, 1974; Pfeffer & Davis-Blake, 1987), and whether internal or external considerations will chiefly drive job rates (Milkovich & Newman, 1990). Efficiency wage theory also implies managerial discretion by assuming that managers make explicit decisions to pay above-market salaries in order to attract and retain high-quality workers (e.g., Weiss, 1980; Yellen, 1984). Finally, the sheer magnitude of interfirm differentials for the same job title—up to 300 percent in a single local labor market—makes it unlikely that differences in job content are the only factors operating (Dunlop, 1957; Gerhart & Milkovich, 1990; Lester, 1952; Rees, 1966; Treiman & Hartmann, 1981).

Given that the most direct determinant of an individual's earnings is the job held rather than the stock of human capital *per se* (Gerhart & Milkovich, 1989; Rosenbaum, 1985; Thurow, 1975), the failure to incorporate job-level data into individual earnings equations is likely to lead to serious misspecification. Thus, it is important to (1) understand how compensation managers make job pay decisions and (2) incorporate knowledge of that process into future studies of individual earnings.

The present research addressed the first of those research needs. Specifically, we examined how compensation managers combined information

about current job pay rates, market survey rates, and job evaluation results¹ in making job pay decisions. Additionally, we investigated how differences in compensation strategies and organizational demographics such as size and industry influenced job pay decisions. Finally, we made tentative observations on the role of job evaluation in job pay decisions, an area of considerable controversy in the relevant literature (e.g., Livernash, 1957; Milkovich & Newman, 1990; Remick, 1981; Schwab, 1980).

RESEARCH QUESTIONS AND HYPOTHESES

Current Pay, Market Rates, and Job Evaluation

Managers make job pay decisions on the basis of multiple factors. These include current pay structures, market surveys, job evaluation, collective bargaining, and employee attraction and retention experiences (Johnson & Ash, 1986; Northrup, 1980; Schwab, 1980). However, most American workers are not covered by collective bargaining agreements (Freeman & Medoff, 1984), and there is no consistent method for integrating direct information about labor supply and demand into decision processes about job pay (Rynes & Milkovich, 1986). In practice, then, the vast majority of compensation managers deal with three pieces of information in determining the pay for a job: the current pay structure in their organization, market survey information, and job evaluation results (Mahoney, Rosen, & Rynes, 1984).

How managers combine these pieces of information can make a substantial difference to pay outcomes. Prior research has shown, for example, that although market surveys and job evaluation results are highly correlated, they nevertheless frequently produce different rank orderings of job worth (e.g., Treiman, 1979; Milkovich & Newman, 1990). The existence of such discrepancies has also been evident in compensation litigation (Rynes & Milkovich, 1986). Indeed, the major impetus for comparable worth litigation has been the fact that pay rates based on market survey results are often lower for jobs dominated by women than pay rates based on job evaluation results would be. Thus, job pay rates depend in a very real way on the relative importance attached to market surveys and job evaluation results in job pay decisions.

A priori, market surveys and job evaluation might simply be regarded as alternative ways of assessing job worth, with neither likely to dominate the other in pay decisions. In practice, however, there are a number of reasons to expect that compensation managers weight market survey information more heavily than job evaluation results. For example, market rates are

¹ Job evaluation is the systematic process of assessing jobs within an organization in order to form a hierarchy of jobs for use in establishing the pay structure. There are many ways to do this, but the most common is the point factor method by which jobs are assigned points on the basis of factors that an organization believes create worth or value. Market surveying is the process of gathering wage and salary information from other firms that hire for jobs similar to those in the surveying organization.

expressed in dollars, a scale used by everyone, making them easy to interpret and compare, whereas job evaluations are described in terms of job point totals that vary in meaning and value across companies. Additionally, examination of comparable worth litigation suggests that when market rates and job evaluation conflict, both employers and judges tend to accord the market more weight in determining appropriate compensation levels (Rynes & Milkovich, 1986). Court testimony reflects two beliefs: (1) regardless of job evaluation results, applicants will not be attracted to "men's jobs" with below-market pay and (2) employers will be at a cost disadvantage if they raise pay for "women's work" to above-market levels. Finally, most employers do not openly communicate the details of their job evaluation ratings. Thus, employees are more likely to know about market rates than job evaluation points and hence to be more sensitive to deviations from market practices than to deviations from job evaluation results. For these reasons, we predict the following:

Hypothesis 1: Compensation managers will weight market survey information more heavily than job evaluation results in job pay decisions.

An additional question concerns the combinatory model used to integrate market survey and job evaluation information. It would be important to know whether changes in market rates and job evaluation points exert a linear effect on job pay decisions or whether nonlinear decision rules—involving, for instance, declining or increasing marginal effects—set in at some point. It is also of interest whether managers consider market survey and job evaluation data independently or whether the effect of job evaluation information depends in some fashion on the specific level of the market rate.

Previous research on decision making has shown that, in general, additive linear models do a good job of predicting judgments, particularly at a between-subjects level (Einhorn & Hogarth, 1982). Although this principle has not been tested with respect to compensation decisions, we predict:

Hypothesis 2: Compensation managers will combine market survey and job evaluation information in an additive linear fashion in making job pay decisions.

Pay Strategies

A review of the compensation literature suggests that organizations have not one but many pay strategies. However, many of these strategies do not concern the pay for particular jobs but relate to other issues, such as forms of pay and pay for specific individuals (Milkovich & Broderick, 1991). In this study, we restricted our attention to two strategy issues explicitly associated with job pay decisions: market leadership position and external or internal orientation.

Market position. Managers appear to make conscious decisions about whether pay levels should lead, lag, or meet the current market level for particular jobs (e.g., Foulkes, 1980; Milkovich & Newman, 1990; Weiss,

1980).² However, there has been some debate about the extent to which companies actually realize intended pay-level strategies. For example, on the basis of anecdotal evidence, Reynolds (1951) concluded that the correspondence between managers' perceptions of their company's market position and actual pay levels was surprisingly weak. However, Gerhart and Milkovich (1990) reported a correlation of .50 between firms' intended executive pay levels and actual executive pay. Thus,

Hypothesis 3: Compensation managers from firms with market-leading policies will assign higher pay rates than those from market meeters, and managers from market-lagging firms will assign lower ones.

External or internal orientation. In the development of any compensation system, the attempt to achieve multiple objectives simultaneously will, at some point, produce conflicts that force decisions about relative priorities. One such strategic choice is whether to emphasize internal consistency in a pay structure or external competitiveness in a labor market (Milkovich & Newman, 1990). Previous work has indicated that firms with a strong internal orientation place a high priority on the historical internal positioning of jobs and job incumbents in pay structures (Doeringer & Piore, 1971; Edwards, Reich, & Gordon, 1975; Osterman, 1988), hoping to decrease turnover and increase work force stability. Companies with an external orientation are more responsive to market rates for a wide range of positions (Levine, 1987; Snow & Miles, 1986), facilitating recruitment and hiring efforts but perhaps increasing turnover.

These hypothesized differences raise the question of whether firms with different orientations place different weights on market survey and job evaluation information in assigning job pay. Previous researchers have viewed market surveys as reflecting the external worth of jobs and job evaluations as reflecting their internal worth (e.g., Remick, 1981; Steinberg, 1985; Treiman, 1979). To the extent that this is a valid assumption, firms with different orientations should place different relative weights on the two types of information. Specifically,

Hypothesis 4: Compensation managers from externally oriented firms will place more weight on market survey information than managers from internally focused firms. Conversely, managers from internally oriented firms will place more weight on current pay rates and job evaluation points than managers from externally focused firms.

It should be noted, however, that the previous literature also suggests an alternative hypothesis. Specifically, some experts have argued that the primary function of job evaluation is not to measure internal worth but rather

² Such decisions are best considered "job pay" strategies because companies commonly adopt different policies for different kinds of jobs, perhaps leading the market for managerial jobs but meeting it for clerical or production jobs (Milkovich & Newman, 1990).

to capture market pay policies for key jobs and to transmit those market policies throughout an organization (Livernash, 1957; Schwab, 1980). In terms of the present study, this argument suggests that the relative weights placed on market and job evaluation information might not differ by orientation because the true purpose of job evaluation is not to estimate internal worth. Rather, when both market rates and job evaluation results are available for a given job, managers will regard job evaluations that are consistent with market surveys as redundant information, and when evaluations are inconsistent with surveys, managers will see them as inferior data. At present, we know of no empirical evidence to suggest which view of job evaluation predominates in actual pay setting, so we based Hypothesis 4 on the conventional view of job evaluation as a measure of internal worth.

The final question explored here is whether externally oriented firms pay more on the average than internally oriented ones. Although one possibility is that neither orientation inherently implies pay levels higher than those characterizing the other, a case can be made for internally oriented firms paying less than externally oriented ones. Because externally oriented firms hire outside job candidates across the entire spectrum of organizational levels, they are directly subjected to market pay pressures at multiple levels. In contrast, in internally oriented firms market rates only directly affect entry-level jobs; rates of pay for higher-level jobs are affected only indirectly and therefore may change more slowly. Additionally, to the extent that externally oriented firms are more likely to hire non-entry-level employees away from other organizations, they may have to pay a wage premium. Hence,

Hypothesis 5: Compensation managers from externally oriented firms will assign higher pay levels on the average than those from internally oriented firms.

METHODS

Overview

Policy capturing—an approach used to examine decision processes in which the levels of critical factors are varied and combined to create hypothetical situations (Slovic & Lichtenstein, 1971)—was used to study the decisions of compensation professionals in setting pay for jobs. Compensation managers assigned new pay rates for hypothetical jobs on the basis of simulated information about current job pay, market survey rates, and job evaluation results. After completing all pay assignments, respondents answered questions about themselves, their companies, and their companies' pay strategies. This information permitted us to examine variance in pay decisions as a function of personal, organizational, and strategic variables.

We used experimental policy capturing for a number of reasons. First, use of an experimental design permitted access to the decision processes of hundreds of compensation professionals from a wide variety of organiza-

tions. Such access would have been impossible to obtain via field surveys, given that companies typically regard information about pay strategies, pay-setting processes, and job pay levels as highly sensitive and proprietary. Beyond that, experimental designs facilitate a direct focus on specific research questions while controlling extraneous sources of variance and minimizing alternative explanations for obtained results. Moreover, policy capturing can minimize a number of cognitive biases associated with direct self-reports of decision processes, such as lack of self-insight into unequal information weighting (Slovic & Lichtenstein, 1971). Finally, previous research has shown experimental policy-capturing results to be predictive of actual decisions in field settings (e.g., Olson, Dell'Omo, & Jarley, 1987), particularly when experimental manipulations realistically represent a natural decision environment (Levin, Louviere, Schepanski, & Norman, 1983).

Data

Questionnaires were sent to about 1,300 members of the American Compensation Association who had taken the association's certification course on setting pay for jobs and individuals. This course includes instruction about creating pay structures based on market wage surveys and job evaluation. Therefore, our potential respondents could be expected to understand the nature of the job pay-setting task.

Pretesting revealed that the simulation took a long time to complete, often more than an hour. Hence, we telephoned all 1,300 recipients to encourage their participation. Completed questionnaires were received from 411 individuals, a response rate of 32 percent. Missing data further reduced the effective number of respondents for some analyses, although it never fell below 363 individuals. A comparison of respondents and nonrespondents on variables that were observable from the mailing list—gender, the version of the questionnaire received (see below), and public or private sector employer—did not reveal any significant differences between the two groups.

Procedures

For the results of policy-capturing research to be generalizable, the decision simulation used should mirror real-world conditions as closely as possible (Levin et al., 1983). We took a variety of steps to insure that both the task and the experimental manipulations were as realistic as possible.

The questionnaire contained one page of instructions, three pages of job-pricing simulations, and two pages requesting background information on recipients. The job-pricing information contained current pay rates, market survey medians, job evaluation points, job titles, and job descriptions for nine jobs. The instructions truthfully informed potential respondents that the data they were about to see came from a real organization in the process of reevaluating its pay structure. We instructed respondents to assign new pay rates in dollars per month to each job "according to the same priorities that would be used in your own organization." Instructions also reminded

participants to think in terms of rates of pay for particular jobs rather than in terms of salaries for individual employees.

To avoid possible detection or discussion of the experimental manipulations, no two surveys were sent to the same company location. Thus, each respondent represented a unique organizational unit. We analyzed the information respondents provided about themselves and their organizations to see what effects that information had on decision-making processes or outcomes. Table 1 reports on characteristics of the respondents and their organizations.

TABLE 1
Summary of Respondents' Characteristics

Characteristics	Frequencies ^a
Personal characteristics	
Title	
Compensation director	35
Compensation manager	28
Senior compensation analyst or compensation analyst	25
Other	12
Average age	38 years
Number of employees whose pay is administered	3,600
Percentage of men	54
Average compensation experience	9 years
Pay strategies	
Pay leadership position	
Lead market	14
Meet market	71
Lag market	15
External orientation	62
Organizational characteristics	
Mean number of employees	9,700
Stage of life cycle	
Expansion	42
Stability	48
Decline	10
Partially or totally unionized	22
Recent organizational change	43
Use market surveys	94
Use job evaluation	80
Industry	
Agriculture-mining	2
Manufacturing	33
Utilities-transportation	7
Retail-wholesale trade	5
Finance	18
Services	22
Public administration	2
Diversified-multiple classification	10

^a Figures are percentages unless otherwise noted.

Manipulations

Job titles, descriptions, and current pay rates for the simulation were drawn from the Washington State job evaluation project (Remick, 1981). Each respondent assigned new pay rates for nine jobs on the basis of the following pieces of information: job title and description, current pay rate, median market survey rate, and job evaluation points.

In order to determine whether pay-setting processes generalized across job categories dominated by men and women, we created two versions of the questionnaire. One version only contained information about jobs held by more than 70 percent women; the other only referred to jobs similarly dominated by men. Each potential respondent received only one version of the questionnaire. Results showed that the gender associated with a job had no effect on pay outcomes. Furthermore, results concerning the pay strategy variables were unaffected by the inclusion or omission of a dummy variable for the gender associated with a job. Thus, we collapsed results across the two versions of the questionnaire.³

Table 2 contains the job titles, current pay rates, market medians, and job evaluation points used in the questionnaires. The origins of the first two pieces of information are straightforward: We abstracted job titles and abbreviated job descriptions from the Washington State study and the *Dictionary of Occupational Titles* (U.S. Department of Labor, Employment and Training Administration, 1977) and took current pay rates from average rates in effect in Washington State at the time of the Washington State study, inflating them to 1986 levels (the simulation was conducted in early 1987).

A fundamental objective of the study was to determine how compensation managers make job pay decisions when alternative sources of information about job worth suggest different outcomes. We therefore built conflicting information into the simulation via the market survey and job evaluation manipulations.

Because current pay, market rates, and job evaluation points are highly correlated in the real world, both the market survey and job evaluation manipulations were derived from current pay rates. For the market manipulation, we assigned three randomly chosen jobs from each version of the questionnaire market rates that were 6 percent higher than their current pay rates (jobs 1, 4, and 6, Table 2). Three other jobs (2, 3, and 7) received market rates that were 6 percent lower than their current pay rates. Market rates for the remaining three jobs (5, 8, and 9) were designed to reflect no discrepancy between the market rate and current pay. To do that, however, we manipulated the market survey rates up or down slightly (1–2%) to disguise their direct relationship to current pay.

³ Readers interested in a more detailed description of the gender manipulation and results can consult Rynes, Weber, and Milkovich (1989).

TABLE 2
Job Pairs and Manipulations

Job Pairs	Current Pay	Market Rate ^a	Job Evaluation Points ^a
1. Editor			
Equipment mechanic I	\$1,770	\$1,880 (+6%)	665 (-6%)
2. Statistical reports compiler			
Caretaker	\$1,310	\$1,230 (-6%)	555 (+6%)
3. Research librarian			
Revenue compliance officer	\$1,690	\$1,590 (-6%)	635 (-6%)
4. Employment interviewer			
Maintenance mechanic I	\$1,570	\$1,665 (+6%)	640
5. Registered nurse			
Electrician	\$2,190	\$2,230	930 (+6%)
6. Secretary II			
Security guard	\$1,350	\$1,430 (+6%)	570 (+6%)
7. Program assistant I			
Warehouse worker I	\$1,440	\$1,355 (-6%)	570
8. Clerk typist II			
Custodian	\$1,200	\$1,190	450 (-6%)
9. Administrative services manager			
Maintenance mechanic II	\$1,880	\$1,860	740

^a Numbers in parentheses indicate the magnitude of the experimental manipulations; where no number is indicated there was no change.

Job evaluation points were likewise based on current pay. For this manipulation, however, we applied a linear transformation to current pay rates, multiplying them by .4 to create a job evaluation baseline on a different scale. This step was necessary to disguise the relationships between current pay and the market rate and job evaluation manipulations; without transformation, the market and job evaluation manipulations would have resulted in identical numbers. Following transformation, we manipulated baseline job evaluation points in exactly the same way as the market survey rates, setting them 6 percent above, 1–2 percent above or below, or 6 percent below base. Doing so was important because using equivalently sized manipulations is essential when there is interest in determining the relative importance of informational cues to overall judgments.

The market survey and job evaluation manipulations were completely crossed in a three-by-three design and randomly assigned to the jobs. In addition to introducing the desired conflict across the three sources of information, this design had two additional attractions. First, the raw numbers for current pay, market rate, and job evaluation were highly correlated, just as they are in actual compensation administration problems. However, crossing the market survey and job evaluation manipulations yielded orthogonal factors in the analyses, thus permitting unambiguous determination of the relative contribution of each to overall pay decisions (Zedeck, 1977).

Measures

The two pay strategy variables were measured as follows. We assessed market position with the following question: "For the kinds of jobs described in this questionnaire, does your organization try to meet the market rate, or is it a market leader, or follower? Circle only one." Answers were dummy coded, with "meets market" as the omitted category. *External or internal orientation* was derived from the following question: "If you were forced to say whether your company's pay rates are influenced more by market forces or internal forces (e.g., existing pay structures, organizational politics) for these kinds of jobs, which would you choose? Check only one."⁴ Internal orientation was the omitted category.

Following prior economic research, we also measured a variety of organizational demographic characteristics and included them as control variables. For example, *organizational size* was dummy coded into four categories: less than 500 employees, 500–999, 1,000–9,999 (the omitted category), and more than 10,000; we used separate variables because the relationship between size and assigned pay level was nonlinear. *Industry* was dummy coded according to two-digit Standard Industrial Classification (SIC) codes into the following categories: agriculture and mining, manufacturing, public utilities and transportation, retail and wholesale trade, finance, services, public administration, and diversified or multiple classification (the omitted category). We coded *annual sales volume* in thousands of dollars but later omitted it because large amounts of data were missing, particularly from financial service organizations. The occurrence of *organizational change* was dummy coded as 1 if an organization had recently undergone a major acquisition, merger, or reorganization. The stage of an organization's life cycle was dummy coded as expansion, stability (the omitted category), or decline. *Recruitment frequency* for the jobs in question ranged from 1, for "hardly ever recruit," to 7, for "recruit almost continuously." *Recruitment difficulty* was coded as the average rating on three seven-point scales reflecting an organization's difficulty in filling clerical-administrative, technical, and production jobs, with 1 for "extremely easy" and 7 for "extremely difficult." *Unionization* was dummy coded as 1 if a respondent's organization was partially or totally unionized for the types of jobs in the questionnaire.

Respondents' personal characteristics, such as job title and experience, were also measured. However, we made no predictions as to how respondents' characteristics would affect their job pay decisions, particularly since we asked them to respond in accordance with their organization's, rather than their own, policies. Because preliminary analyses revealed that per-

⁴ We deliberately excluded job evaluation points from the elaboration of "internal forces" to avoid leading managers to treat job evaluation points as measures of internal worth unless they normally would do so in their organizations.

sonal characteristics had no main effects on or interactions with the strategy variables, we omitted personal characteristics from subsequent analyses.

Analyses

Hierarchical multiple regression methods were used to determine the impact of the experimental manipulations, organizational characteristics, and pay strategies on assigned job pay rates (see Table 3). Model 1 examined

TABLE 3
Results of Regression Analysis for New Pay Rate

Variables	Model 1	Model 2	Model 3
Manipulations			
Current pay	1.01***	1.02***	1.00***
Market rate	60.21***	60.43***	49.49***
Job evaluation	30.95***	31.70***	35.80***
Market rate \times job evaluation	-7.46**	-7.67*	-7.69**
Organizational demographics			
<500 employees		19.34**	17.86**
500-999 employees		1.86	2.68
>10,000 employees		-12.71*	-17.31***
Unionization		7.25	2.52
Organizational change		-10.37*	-8.90*
Decline		-6.52	-8.12
Expansion		-1.44	-6.98
Recruitment frequency		-0.09	0.93
Recruitment difficulty		-8.54***	-7.53**
Agriculture and mining		-22.63	-28.61
Manufacturing		-5.05	-10.28
Public utilities and transportation		30.21**	23.89**
Retail and wholesale trade		17.63	9.69
Finance		-1.82	-2.06
Services		-3.47	-11.06
Public administration		-33.77*	-29.94
Strategies			
Market leadership			63.97***
Market lagging			-19.23**
External orientation			-60.22*
Orientation \times current pay			0.02
Orientation \times market rate			16.68**
Orientation \times job evaluation			-6.29
df	3,694	3,318	3,249
R ²	.88	.88	.88
F	6,536.78***	1,171.42***	915.92***
Incremental F			
Model 2 versus model 1		-0.47	
Model 3 versus model 1			4.86**
Model 3 versus model 2			19.46**

* $p < .05$

** $p < .01$

*** $p < .001$

job pay decisions as a function of the experimental manipulations only (current pay, market rate, and job evaluation points) to test whether compensation managers gave market rates more weight than job evaluation points in job pay decisions (Hypothesis 1). Model 1 also included the interaction of market rate and job evaluation to test whether managers combined that information in an additive linear fashion (Hypothesis 2).

Model 2 examined the contribution of organizational demographic variables over and above those of current pay and market survey and job evaluation information. Included characteristics were size, industry, unionization, life cycle, organizational change, recruiting difficulty, and recruiting frequency. Finally, model 3 examined whether market-leading and external orientation strategies had the hypothesized positive effects on assigned pay levels (Hypotheses 3 and 5), controlling for organizational demographic characteristics. By including orientation-by-manipulation interactions, model 3 also tested the hypothesis that externally and internally oriented firms differentially weight market surveys and job evaluation (Hypothesis 4).

Testing the three models a second time, we omitted current pay rate as an independent variable and instead used change in pay rates (new rate minus current rate) as the dependent variable (Table 4). We examined this second set of models because all organizations except start-up ones establish pay for jobs incrementally in relation to their current pay structure. Additionally, by removing the sizable effects of current pay on new pay rates, these change analyses facilitated comparison of the relative contributions of organizational demographic characteristics and pay strategy variables on pay decisions. We assessed relative effect sizes via changes in R^2 and incremental F -tests of full and reduced models (Pindyck & Rubinfeld, 1981: 117–119).

RESULTS

Table 3 summarizes the influence of the experimental manipulations, organizational demographics, and pay strategies on new pay assignments; Table 4 summarizes their influence on changes in pay.⁵ A comparison of the two tables shows that the coefficients and significance levels for the independent variables other than current pay are very stable across the analyses. However, including current pay as a predictor adds substantially to the overall variance explained in the new pay models (Table 3). This finding reflects the substantive reality that job pay decisions are heavily anchored in

⁵ The nine jobs priced by each manager were treated as nine observations. This approach introduces serial correlation, which results in inefficient but unbiased estimators. To assess the effect of serial correlation on observed significance levels, we ran additional regressions that included a dummy variable for each subject. These regressions produced the same significant and nonsignificant effects; therefore, those results are not reported here. However, this finding suggests that serial correlation is not a severe problem in these analyses.

TABLE 4
Results of Regression Analysis for Change in Pay Rate

Variables	Model 1	Model 2	Model 3
Manipulations			
Market rate	61.07***	61.39***	50.10***
Job evaluation	31.67***	32.51***	36.12***
Market rate \times job evaluation	-7.60**	-7.83*	-7.84**
Organizational demographics			
<500 employees		19.34**	17.78**
500-999 employees		1.86	2.59
>10,000 employees		-12.71*	-17.50**
Unionization		7.25	2.47
Organizational change		-10.37*	-8.82*
Decline		-6.52	-8.15
Expansion		-1.44	-6.91
Recruitment frequency		-0.09	0.94
Recruitment difficulty		-8.54***	-7.45***
Agriculture and mining		-22.63	-29.16
Manufacturing		-5.05	-10.80
Public utilities and transportation		30.21**	23.41*
Retail and wholesale trade		17.63	9.24
Finance		-1.82	-2.60
Services		-3.47	-11.62
Public administration		-33.77*	-30.40
Strategies			
Market leadership			63.92***
Market lagging			-19.33**
External orientation			-35.99*
Orientation \times market rate			17.28***
Orientation \times job evaluation			-5.62
df	3,695	3,319	3,251
R ²	.11	.13	.17
F	146.12***	25.31***	27.10***
Incremental F			
Model 2 versus model 1		4.84**	
Model 3 versus model 1			11.12**
Model 3 versus model 2			30.92**

* $p < .05$ ** $p < .01$ *** $p < .001$

past pay practices as well as the methodological principle that change scores yield lower variance-explained estimates than raw scores (e.g., Cronbach & Furby, 1970).

Both the market rate and job evaluation manipulations contributed significantly to managers' pay decisions in all models. However, consistent with Hypothesis 1, changes in market rates consistently produced larger differences in assigned pay, particularly in models 1 and 2. The relative reduction in the size of the market coefficients in model 3 suggests that pay

strategies were responsible for at least some of the variance attributed to the market manipulation in the less comprehensive models.

Contrary to Hypothesis 2, there was a significant, negative interaction between the market rate and job evaluation manipulations. Plotted cell means suggested that an additive model fitted the data quite well, except for the cell in which both manipulations added 6 percent to baseline (job 6). In this case, respondents awarded a much smaller increment to current pay than a purely additive model would have predicted (\$77 vs. \$126; see Figure 1).

Turning to the pay strategy variables, we found that managers from firms with market-leading policies assigned significantly higher pay levels than those from market-meeting firms. Similarly, market-laggers assigned lower pay, thus confirming Hypothesis 3.

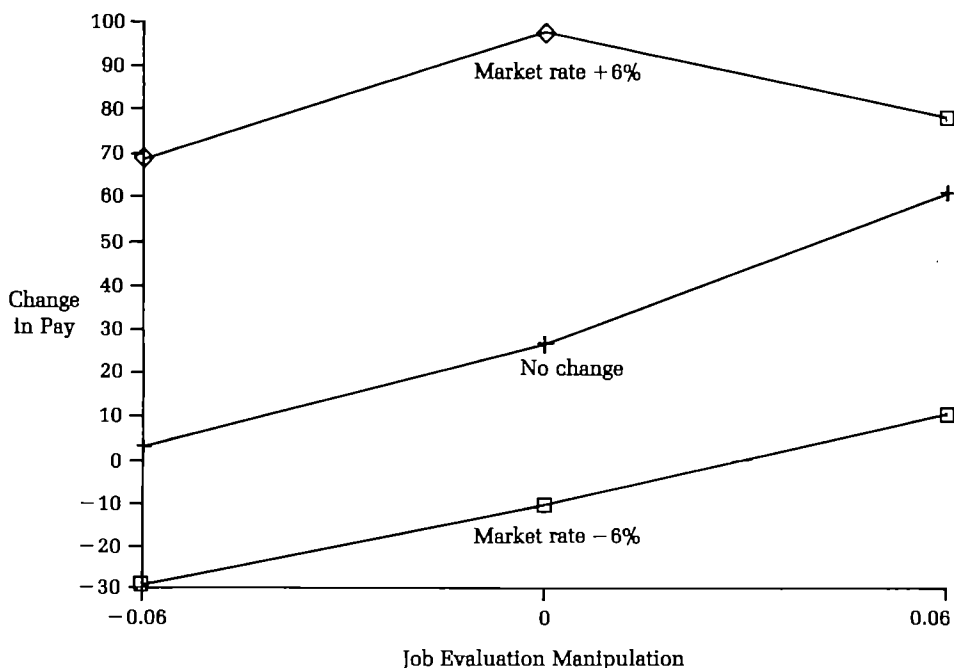
Hypothesis 4, which predicted an interaction between orientation and the experimental manipulations, received some support. Specifically, the orientation-by-market rate interaction confirmed that managers from externally oriented firms placed greater weight on market rates than those from internally oriented firms. However, the interaction between orientation and the job evaluation manipulation was not significant, implying that managers from internally oriented organizations did not place greater weight on job evaluations than externally oriented managers.

These preliminary results were confirmed by running separate regression equations for internally and externally oriented respondents. A comparison of standardized coefficients showed that the two weighted the job evaluation manipulation virtually identically, with the externally oriented assigning it a value of .22 and the internally oriented a value of .21. However, the former placed substantially more weight on the market manipulation than the latter (.49 vs. .29). Put another way, managers from internally oriented firms paid roughly equivalent attention to market survey and job evaluation information, whereas those from externally oriented firms weighted market information approximately twice as heavily as job evaluation results.

Examination of cell and marginal means for the two manipulations revealed further that the differences in reactions to the market manipulation were concentrated almost exclusively in the three jobs for which we reduced the market rate by 6 percent (Table 5). Specifically, managers from externally oriented companies were far more likely than those from internally oriented companies to reduce job pay when market rates were below current pay levels: marginal means for the 6-percent-below-market manipulation were -\$23 for the former and +\$4 for the latter (bottom row, Table 5).

This difference in reactions to the 6-percent-below-market manipulation also contributed to our finding a negative main effect for external orientation. Across all manipulations, externally oriented managers assigned an average increment of \$28, versus \$41 for the internally oriented. Again, the source of this difference was almost exclusively confined to the 6-percent-below-market condition. This result conflicts with our *a priori* hypothesis that the pay assignments of internally oriented firms would lag behind those of externally oriented firms (Hypothesis 5).

FIGURE 1
Changes in Pay Rates by Manipulations



Turning to comparisons of the three models, we found that a number of organizational characteristics—size, industry, recent organizational change, and recruitment difficulties—had main effects on pay assignments (model 2). However, incremental *F*-tests comparing models 1 and 2 revealed that as a set, organizational characteristics did little to improve model efficiency. In comparison, adding the pay strategy variables contributed significantly to efficiency when we compared the resulting model against both model 1 and 2. Although not reported in the tables, additional analyses revealed that the most efficient model was one containing the manipulations and the pay strategy variables and omitting organizational demographic characteristics (incremental *F* = 27.33).

Finally, given the impact of pay strategies on pay outcomes, we attempted to ascertain the determinants of pay strategy decisions using multinomial “logit” and “probit” procedures (Hanushek & Jackson, 1977)⁶ to predict choice of market position and orientation. Each of these strategies was modeled, in turn, as a function of industry, unionization, organizational

⁶ Logit and probit are the appropriate regression methods to use when the dependent variable is categorical or otherwise limited, as is the case with orientation (two categories) and market position (three categories).

TABLE 5
Change in Pay Rates as a Function of Orientation^a

Job Evaluation Manipulations	Market Manipulations			Marginal Means
	Minus 6 Percent	No Change	Plus 6 Percent	
Minus 6 percent	Job 3: -\$40 (-\$12)	Job 8: -\$1 (\$10)	Job 1: \$73 (\$65)	\$11 (-\$21)
No change	Job 7: -\$21 (\$2)	Job 9: \$27 (\$26)	Job 4: \$97 (\$98)	\$34 (\$42)
Plus 6 percent	Job 2: -\$9 (\$36)	Job 5: \$53 (\$66)	Job 6: \$75 (\$80)	\$40 (\$61)
Marginal means	-\$23 (\$4)	\$26 (\$34)	\$82 (\$81)	

^a Figures for external orientation appear first, and figures for internal orientation follow in parentheses. Figures are based on using change in pay as the dependent variable.

change, life cycle stage, size, and one or the other strategy variable (i.e., with orientation modeled as a function of pay leadership position and vice versa).

For orientation, probit results suggested that externally driven organizations were significantly more likely to meet the market than to be leaders or followers. Post hoc examination of the leadership-by-orientation frequency distribution confirmed these results, showing that the vast majority (79%) of externally oriented firms were market meeters and that the internally oriented firms exhibited a more evenly distributed range of market positions (24 percent laggards, 59 percent meeters, and 17 percent leaders). Additionally, public utilities and services were significantly less likely to report external orientations than were diversified and multiple classification organizations, the omitted category.

For market position, multinomial logit results again suggested that external orientation was associated with intentions to meet rather than lead or follow the market. Unionized organizations were more likely to be pay leaders, and expanding organizations were more likely to be laggards or meeters than market leaders. Finally, respondents working in public administration were more likely to be market followers.

These last results should be interpreted with caution, however, because we do not claim to have used a nationally representative sample of industries and organizations. Furthermore, because predicting pay strategies was not the major focus of this research, we almost certainly did not capture all potentially relevant predictor variables.

DISCUSSION

Results suggest that both job evaluation and market survey information figure importantly in compensation managers' job pay decisions. However,

as hypothesized, increases in market rates produced larger increments in pay assignments than did equivalent increases in job evaluation points. This difference diminished but did not disappear when we took organizational pay strategies into account, suggesting that managers employing different strategies make different use of the two pieces of information.

The preeminence of market rates in job pay-setting is problematic for those who advocate the use of job evaluation as a substitute for market valuation of job worth (e.g., Remick, 1981). Until now, arguments against using job evaluation to reorder job pay hierarchies have focused almost exclusively on job evaluation systems' reliance on market rates for validation of compensable factors and weights (Hildebrand, 1980; Schwab, 1980). Thus, skeptics have questioned the viability of developing and using job evaluation plans that are independent of market compensation rules.

The present study suggests an additional difficulty with attempting to increase reliance on job evaluation: managers do not appear to attach as much importance to job evaluation results as they do to market surveys. Two caveats are in order, however. First, this conclusion appears to depend somewhat on a firm's strategic orientation, since our internally oriented respondents placed nearly as much weight on job evaluation results as they did on market surveys. Second, managers might attach more weight to their own job evaluation systems than to an experimentally generated one. However, this argument seems equally likely to apply to market surveys.

Nevertheless, the fact that the job evaluation manipulation consistently explained significant, unique variance in pay assignments, even among externally oriented respondents, lends credence to the view that managers regard job evaluation as something more than a capturer of market pay policies. If job evaluation were viewed merely as providing redundant or inferior information, there would not be a main effect for job evaluation here since market information was available for each job.

Although job evaluations appear to provide unique pay-setting information, it is less clear that managers regard them as indicators of the internal worth of a job. Specifically, although internally oriented respondents placed less weight on market surveys than externally oriented managers, the former did not place more emphasis on job evaluation. Put another way, internally oriented respondents were distinguished more by their reluctance to act on market data under certain conditions than by any tendency to place greater emphasis on job evaluation *per se*.

The reluctance of internally oriented managers to cut pay when market rates were lower than their firm's current rates resulted in their paying more on the average than externally oriented managers. This result suggests that having an internal orientation may be an expensive proposition if it prevents a firm from taking advantage of lower competitive rates in an external market. However, the generalizability of this result almost certainly depends on the proportion of real-world instances in which market rates lag or lead current pay rates in internally oriented organizations. Just as having an in-

ternal orientation may prevent firms from taking advantage of low competitive rates, so may it protect them from having to immediately incorporate upward movements in market rates. However, there is little evidence of this latter phenomenon in the present results, as the last column of Table 5 indicates.

Finally, the pay strategy variables contributed more to the model of job pay decisions than did the organizational demographic variables. In fact, the results suggest that job pay decisions might be most parsimoniously modeled as a function of current pay, market rates, internal job structure, and pay strategies like market position and orientation. However, these results should be interpreted with some caution, given that anonymous questionnaire respondents rather than a source like annual reports or Standard and Poor's COMPUSTAT files provided our demographic data. Although the pay strategy measures were also self-reported, it seems likely that the respondents were more familiar with pay strategies than with certain organizational demographics. Indeed, we had to omit measures of financial performance because large amounts of data were missing.

FUTURE RESEARCH

Certain future research suggestions flow directly from the present study; others arise from a more general concern with job pay and organizational pay structures. Turning first to direct research extensions, we suggest that the present results imply the desirability of explicitly incorporating pay strategy variables into future job pay research. To date, most studies have included such general organizational characteristics (as size, profitability, and life-cycle stage) as proxies for likely pay strategies (Balkin & Gomez-Mejia, 1987; Brown, 1990; Ellig, 1982). However, the present results suggest that pay strategies have a significant effect on job pay decisions, even with organizational characteristics controlled. In view of the significance of pay strategies, researchers should make a greater attempt to include them explicitly in future research.

Additional attempts should also be made to ascertain the determinants of pay strategies. Consistent with previous research and speculation (Balkin & Gomez-Mejia, 1987; Ellig, 1987; Freeman & Medoff, 1984), the present results suggest that unionization is associated with market leadership pay strategies and that expansion is associated with market following. Also, the present results suggested the commonsensical finding that attempts to meet the market are associated with external orientations. However, because predicting pay strategies was not our major focus, future research should bring representative organizational samples and additional predictor variables to bear on this question.

The negative interaction between the market rate and job evaluation manipulations also suggests a future research need. Specifically, the present results do not indicate whether the interaction is attributable to idiosyncra-

cies of the jobs involved or whether it reflects a more general conservatism about granting large increases in any single job pay adjustment.⁷ Future research could help examine these competing explanations.

Looking beyond the specific results of this study, we see a need to expand pay-setting research to other types of jobs and other kinds of decision makers. In the former case, it would be particularly useful to examine higher-level jobs, which are likely to vary more widely across organizations than the types of jobs used here. As for the latter, it would be interesting to examine the pay decisions of line managers and directors. Additionally, future experimental manipulations might include more-direct measures of labor supply and demand (for instance, vacancy and retention rates) as well as contextual variables other than the gender associated with a job (union presence, pay communication policies).

Finally, there is also an important role for field research, particularly in uncovering potential relationships between organizational characteristics, pay strategies, and pay outcomes. Little field research has examined differences in job pay or linked such differences to differences in pay strategies.⁸

Researchers choosing between using a field or an experimental research design to investigate pay setting should keep in mind that some questions—including the ones asked in the present simulation—are extremely difficult to examine in field settings. Decisions based on highly proprietary information like specific pay rates or requiring close control over job content, administrative pay-setting procedures, and so on are examples. On the other hand, field research would appear to be particularly appropriate for ascertaining how organizational characteristics, pay strategies, and such administrative pay practices as the use or nonuse of job evaluation and the number of separate pay structures in an organization fit together in the real world.

At present, most compensation is administered in such a way that decisions about job pay precede, and hence severely constrain, decisions about individual pay. Although some experts have suggested that the whole notion of paying for jobs is fast becoming obsolete (e.g., Appelbaum, 1985; Gupta, Jenkins, & Curington, 1986; Piore & Sabel, 1985), at present such innovative practices are far more widely discussed than practiced (O'Dell, 1987), not least because they involve considerable administrative difficulties (e.g., Wallace & Fay, 1988). Basic administrative procedures for determining job and individual pay have remained largely unchanged since World War II, when an increasing number of firms adopted job evaluation systems as a way of stabilizing pay procedures and accommodating market wage pressures without strikes (Kerr & Fisher, 1950). The persistence of basic job pay-setting techniques in the face of vast changes in labor and product market condi-

⁷ Managers would have had to give a \$126 (9.3%) increment to the secretary II and guard jobs to preserve additivity. Although this might not seem like a very big increment in terms of individual pay, it might well take on great significance if an entire class of job incumbents were eligible for the increase.

⁸ Exceptions are Gerhart and Milkovich (1990) and Pfeffer and Davis-Blake (1987).

tions suggests that job pay decisions are likely to remain important determinants of individual earnings for some time to come.

REFERENCES

- Appelbaum, E. 1985. Technology and work organization in the insurance industry. *ILR Report*, 23(1): 21–26.
- Balkin, D. J., & Gomez-Mejia, L. R. 1987. A contingency theory of compensation strategy. *Strategic Management Journal*, 8: 169–182.
- Bartol, K. M., & Martin, D. C. 1989. Effects of dependence, dependency threats, and pay secrecy on managerial pay allocations. *Journal of Applied Psychology*, 74: 105–113.
- Becker, G. S. 1964. *Human capital*. New York: Columbia University Press.
- Belcher, D. W. 1974. *Compensation administration*. Englewood Cliffs, NJ: Prentice-Hall.
- Brown, C. 1990. Firms' choice of method of pay. *Industrial & Labor Relations Review*, 43: 165–182.
- Cronbach, L. J., & Furby, L. 1970. How we should measure "change"—or should we? *Psychological Bulletin*, 74: 68–80.
- Dickens, W. T., & Katz, L. F. 1986. *Industry wage differences and industry characteristics*. Working paper no. 2271, National Bureau of Economic Research, Cambridge, MA.
- Doeringer, P., & Plore, M. 1971. *Internal labor markets and manpower analysis*. Lexington, MA: D. C. Heath & Co.
- Dunlop, J. T. 1957. The task of contemporary wage theory. In G. W. Taylor & F. C. Pierson (Eds.), *New concepts in wage determination*: 127–139. New York: McGraw-Hill Book Co.
- Dunn, L. 1986. Work disutility and compensating wage differentials: Estimation of factors in the link between wages and firm size. *Review of Economics and Statistics*, 68: 67–73.
- Edwards, R. C., Reich, M., & Gordon, D. M. 1975. *Labor market segmentation*. Lexington, MA: D. C. Heath & Co.
- Einhorn, H. J., & Hogarth, R. M. 1982. Behavioral decision theory: Processes of judgment and choice. In G. R. Ungson & D. N. Braunstein (Eds.), *Decision making: An interdisciplinary inquiry*: 15–41. Boston: Kent Publishing.
- Ellig, B. R. 1982. *Executive compensation—A total pay perspective*. New York: McGraw-Hill Book Co.
- Ellig, B. R. 1987. Strategic pay planning. *Compensation and Benefits Review*, 19(4): 28–43.
- Fossum, J. A., & Fitch, M. K. 1985. The effects of individual and contextual attributes on the sizes of recommended salary increases. *Personnel Psychology*, 38: 587–602.
- Foulkes, F. K. 1980. *Personnel policies in large nonunion companies*. Englewood Cliffs, NJ: Prentice-Hall.
- Freeman, R. B., & Medoff, J. L. 1984. *What do unions do?* New York: Basic Books.
- Gerhart, B. A., & Milkovich, G. T. 1989. Salaries, salary growth, and promotions of men and women in a large, private firm. In R. T. Michael & H. Hartmann (Eds.), *Pay equity: Empirical inquiries*: 23–43. Washington, DC: National Academy Press.
- Gerhart, B. A., & Milkovich, G. T. 1990. Organizational differences in managerial compensation and financial performance. *Academy of Management Journal*, 33: 663–691.
- Gibbons, R., & Murphy, K. J. 1990. Relative performance evaluation for chief executive officers. *Industrial and Labor Relations Review*, 43: 30–51.
- Gupta, N., Jenkins, G. D., & Curington, W. P. 1986. Paying for knowledge: Myths and realities. *National Productivity Review*, 5: 107–123.

- Hanushek, E. A., & Jackson, J. E. 1977. *Statistical methods for social scientists*. New York: Academic Press.
- Hildebrand, G. 1980. The market system. In E. R. Livernash (Ed.), *Comparable worth: Issues and alternatives*: 79–106. Washington, DC: Equal Employment Advisory Council.
- Johnson, N. B., & Ash, R. A. 1986. *Integrating the labor market with job evaluation: Clearing the cobwebs*. Paper presented at the meeting of the Society for Industrial and Organizational Psychology, Chicago.
- Kanter, R. M. 1987. From status to contribution: Some organizational implications of the changing basis for pay. *Personnel*, 64(1): 12–37.
- Kerr, C., & Fisher, L. H. 1950. Effect of environment and administration on job evaluation. *Harvard Business Review*, 28(3): 77–96.
- Lawler, E. E. III. 1986. *High involvement management*. San Francisco: Jossey-Bass.
- Lester, R. A. 1952. A range theory of wage differentials. *Industrial and Labor Relations Review*, 5: 483–500.
- Levin, I. P., Louviere, J. J., Schepanski, A. A., & Norman, K. L. 1983. External validity tests of laboratory studies of information integration. *Organizational Behavior and Human Performance*, 31: 173–193.
- Levine, H. Z. 1987. Compensation and benefits today: Board members speak out (part 1). *Compensation and Benefits Review*, 19: 23–40.
- Livernash, E. R. 1957. The internal wage structure. In G. W. Taylor & F. W. Pierson (Eds.), *New concepts in wage determination*: 140–172. New York: McGraw-Hill Book Co.
- Mahoney, T. A., Rosen, B., & Rynes, S. L. 1984. Where do compensation specialists stand on comparable worth? *Compensation Review*, 16(4): 27–40.
- Masters, S. H. 1969. An interindustry analysis of wages and plant size. *Review of Economics and Statistics*, 51: 341–345.
- Mellow, W. 1982. Employer size and wages. *Review of Economics and Statistics*, 64: 495–501.
- Milkovich, G. T., & Broderick, R. 1991. Developing a compensation strategy. In M. L. Rock & L. A. Berger (Eds.), *Handbook of wage and salary administration* (3d ed.): forthcoming. New York: McGraw-Hill Book Co.
- Milkovich, G. T., & Newman, J. M. 1990. *Compensation*. Plano, TX: Business Publications, Inc.
- Mincer, J., & Polachek, S. 1974. Family investments in human capital: Earnings of women. *Journal of Political Economy*, 82: S76–S108.
- Northrup, H. R. 1980. Wage setting and collective bargaining. In E. R. Livernash (Ed.), *Comparable worth: Issues and alternatives*: 107–136. Washington, DC: Equal Employment Advisory Council.
- O'Dell, C. 1987. *People, performance and pay*. Houston: American Productivity Center.
- Olson, C. A., Dell'Omo, G. C., & Jarley, P. 1987. *A comparison of arbitrator decision-making in experimental and field settings*. Paper presented at the annual meeting of the Econometric Society, Chicago.
- Osterman, P. 1988. *Employment futures: Reorganization, dislocation, and public policy*. Oxford, England: Oxford University Press.
- Pfeffer, J., & Davis-Blake, A. 1987. Understanding organizational wage structures: A resource dependence approach. *Academy of Management Journal*, 30: 437–455.
- Pindyck, R. S., & Rubinfeld, D. L. 1981. *Econometric models and forecasts* (2d ed.). New York: McGraw-Hill Book Co.

- Piore, M. J., & Sabel, C. F. 1985. *The second industrial divide*. New York: Basic Books.
- Rees, A. 1966. Information networks in labor markets. *American Economic Review*, 56: 559–566.
- Ramick, H. 1981. The comparable worth controversy. *Public Personnel Management Journal*, 10: 371–383.
- Reynolds, L. G. 1951. *The structure of labor markets*. New York: Harper & Row Publishers.
- Rosenbaum, J. E. 1985. Jobs, job status, and women's gains from affirmative action: Implications for comparable worth. In H. I. Hartmann (Ed.), *Comparable worth: New directions for research*: 116–136. Washington, DC: National Academy Press.
- Rynes, S. L., & Milkovich, G. T. 1986. Wage surveys: Dispelling some myths about the "market wage." *Personnel Psychology*, 34: 71–90.
- Rynes, S. L., Weber, C. L., & Milkovich, G. T. 1989. Effects of market survey rates, job evaluation, and job gender on job pay. *Journal of Applied Psychology*, 74: 114–123.
- Schwab, D. P. 1980. Job evaluation and pay setting: Concepts and practices. In E. R. Livernash (Ed.), *Comparable worth: Issues and alternatives*: 49–78. Washington, DC: Equal Employment Advisory Council.
- Slovic, P., & Lichtenstein, S. 1971. Comparison of Bayesian and regression approaches to the study of information processing in judgment. *Organizational Behavior and Human Performance*, 6: 649–744.
- Snow, C. C., & Miles, R. E. 1986. Organizational strategy, design, and human resources management. In S. L. Rynes & G. T. Milkovich (Eds.), *Current issues in human resource management*: 60–69. Plano, TX: BPI.
- Steinberg, R. J. 1985. Identifying wage discrimination and implementing pay equity adjustments. In U.S. Commission on Civil Rights (Eds.), *Comparable worth: Issue for the 80s* (vol. 1): 96–116. Washington, DC: U.S. Commission on Civil Rights.
- Thurow, L. H. 1975. *Generating inequality*. New York: Basic Books.
- Treiman, D. J. 1979. *Job evaluation: An analytic review*. Washington, DC: National Academy of Sciences.
- Treiman, D. J., & Hartmann, H. I. (Eds.). 1981. *Women, work, and wages: Equal pay for jobs of equal value*. Washington, DC: National Academy Press.
- U.S. Department of Labor, Employment and Training Administration. 1977. *Dictionary of occupational titles* (4th ed.). Washington, DC: U.S. Department of Labor, Employment and Training Administration.
- Wallace, M. J., & Fay, C. H. 1988. *Compensation theory and practice* (2d ed.). Boston: PWS-Kent.
- Weeks, D. (Ed.). 1976. *Compensating employees: Lessons of the 1970s*. New York: Conference Board.
- Weiss, A. 1980. Job queues and layoffs in labor markets with flexible wages. *Journal of Political Economy*, 88: 526–538.
- Weiss, L. A. 1966. Concentration and labor earnings. *American Economic Review*, 56: 96–117.
- Yellen, J. 1984. Efficiency wage models of unemployment. *American Economic Review*, 74: 200–205.
- Zedeck, S. 1977. An information processing model and approach to the study of motivation. *Organizational Behavior and Human Performance*, 18: 47–77.

Caroline L. Weber is a candidate for a Ph.D. degree in the Department of Personnel and Human Resource Studies at the New York State School of Industrial and Labor Relations, Cornell University. Her compensation research focuses on the determinants of job pay, pay structures, pay differentials, and the use of different types of incentive systems. In addition, she has conducted research on strategic human resource planning in international environments and the determinants of promotion opportunities in organizations.

Sara L. Rynes is a professor of management and organizations at the College of Business Administration, University of Iowa. She received her Ph.D. degree in industrial relations from the University of Wisconsin, Madison. She has conducted research in the areas of compensation, recruitment, selection, careers, managerial decision making, and human resource strategies.

COMMUNICATION WITH EMPLOYEES FOLLOWING A MERGER: A LONGITUDINAL FIELD EXPERIMENT

DAVID M. SCHWEIGER
University of South Carolina

ANGELO S. DENISI
Rutgers University

This study examined the impact of a realistic merger preview, a program of realistic communications, on employees of an organization that had just announced a merger. Employees in one plant received the preview and those in another received limited information. Results based on four collections of data indicated that the preview reduced dysfunctional outcomes of the merger. Those effects continued over the duration of the study and, in some cases, measured attributes returned to levels comparable to their levels before the merger was announced. We discuss implications for organizations contemplating mergers or acquisitions and for researchers interested in such activities.

Although corporate mergers and acquisitions have become an important part of American commerce, it is only recently that researchers and practitioners have become concerned about their effects on employees (e.g., Bastien, 1987; Buono & Bowditch, 1989; Jick, 1979; Graves, 1981; Hirsch, 1987; Ivancevich, Schweiger, & Power, 1987; Marks & Mirvis, 1983, 1985; Napier, Simmons, & Stratton, 1989; Rentch & Schneider, 1989). Specifically, the problems that arise from uncertainty regarding the organizational and personnel changes that usually follow mergers and acquisitions have received considerable attention. That uncertainty creates stress for employees but cannot be easily avoided since many of the changes associated with mergers and acquisitions are evolutionary, and final outcomes are often not known during negotiations (Jemison & Sitkin, 1986a,b; Schweiger & Weber, 1989; Schweiger, Ivancevich, & Power, 1987).

Even when top managers do know what changes will occur, they are often unable or unwilling to discuss the changes with employees for a number of reasons discussed later in this article (Mirvis & Marks, 1986). Regardless of its cause, any failure to communicate leaves employees uncertain about their futures, and it is often that uncertainty, rather than the changes themselves, that is so stressful for employees. In such situations, it is not surprising that employees will seek other means for reducing uncertainty, such as reliance on rumors and other informal communications (Napier et

al., 1989). But rumors are not an effective means of reducing anxiety, since they tend to focus on negative, often quite inaccurate information (Rosnow, 1988). In fact, as Buono and Bowditch noted, during mergers and acquisitions activity, "rumor mills and the grapevine work overtime, leading to more anxiety and, in many cases, counterproductive behaviors. Often based on fears rather than reality, these rumors can significantly exacerbate employee anxiety, tension, and stress" (1989: 257). Further, the repetitive nature of rumors tends to strengthen people's belief in them (Rosnow & Fine, 1976), and so subsequent management attempts to deny well-developed rumors that possess even a grain of truth can easily compromise employees' faith in management's honesty (Rosnow, 1980, 1988).

Thus, it seems that the only way for management to deal with the anxiety that follows a merger or acquisition announcement is to communicate with employees as soon as possible about all the anticipated effects of the change. Failure to do so will increase uncertainty and employees' willingness to rely upon rumors, which can further increase anxiety. That uncertainty and anxiety can lead to such dysfunctional outcomes as stress, job dissatisfaction, low trust in the organization and commitment to it, and increased intentions to leave the organization (Ashford, Lee, & Bobko, 1989; Bastien, 1987; Buono, Bowditch, & Lewis, 1985; Gil & Foulger, 1978; Marks & Mirvis, 1983; Robino & DeMause, 1985; Schweiger & Ivancevich, 1985; Sinetar, 1981; Shirley, 1973). Those dysfunctions can, in turn, diminish productivity and increase turnover and absenteeism.

COMMUNICATIONS AND THE REDUCTION OF UNCERTAINTY

Despite the previous arguments concerning the dysfunctional outcomes of a lack of managerial communication, managers must consider other aspects of fully communicating anticipated changes to employees. First, as noted above, top management often does not know exactly what will happen until far into a merger or acquisition process, and so realistic communication may be impossible. A management might prefer communicating nothing to communicating information that later turns out to be incorrect. Perhaps managers should communicate what they know and insure that employees are never intentionally deceived. They can offer to answer questions and explain why some questions cannot be answered. Further, communication should focus on areas of particular concern to employees during mergers and acquisitions, such as layoffs and changes in pensions, work rules, and compensation (Ivancevich et al., 1987).

Some previous work, however, has suggested that management should avoid communicating realistically with employees during mergers and acquisitions. It has been suggested that such communications might alert competitors or cause employees to leave an organization rather than endure painful changes (Buono & Bowditch, 1989; Jemison & Sitkin, 1986a, b; Marks & Mirvis, 1986; Pritchett, 1985; Schweiger et al., 1987). Eisenberg and Witten

(1987) further warned that such communications can threaten management's ability to respond flexibly to changes during a merger or acquisition process.

Thus, it seems there may be equally compelling arguments on both sides of the question of whether management should try to communicate realistic information to employees during a merger or acquisition. Unfortunately, the empirical evidence that bears upon this question is extremely limited. In fact, only three studies have examined the issue, all retrospective studies that did not directly measure uncertainty or dysfunctional outcomes. For example, a study reported by Bastien (1987) involved interview data from 21 managers and employees from three different organizations that had been involved in acquisitions and suggested that communications might have increased performance and reduced uncertainty. The studies of Napier and her colleagues (1989) and Graves (1981), also conducted after the fact, produced similar suggestions for increased communication in the form of employee-management meetings and even a merger newsletter. Again, the researchers measured neither uncertainty nor any of the supposed dysfunctional outcomes said to follow uncertainty. Thus, these studies shed little light on the full impact of mergers and acquisitions on employees or on methods of softening that impact. Fortunately, a somewhat similar line of research in a different area may provide empirical support for the idea that communication is a necessary part of mergers and acquisitions activity and may even provide some theoretical justification for how and why such communication should work.

Realistic Job Previews

Like the employees of an organization engaged in a merger or acquisition, newcomers entering an organization also face high levels of uncertainty that can result in dysfunctional outcomes. Researchers and practitioners have suggested a mechanism called realistic job previews for reducing newcomers' uncertainty, bringing their expectations in line with reality, and helping them cope with the transition to their new jobs. Realistic job previews provide complete and realistic information about a job, including both its positive and negative aspects, usually in the form of a film or videotape. Space considerations preclude giving a thorough review of the literature on realistic job previews, and several excellent reviews exist (e.g., Breaugh, 1983; Dugoni & Ilgen, 1981; Premack & Wanous, 1985). In general, the results of studies in this area have been encouraging. New employees who receive previews tend to be more satisfied with their jobs and more committed to their organizations, to experience less stress, and to be less likely to leave than employees socialized through more traditional methods. It should be noted, however, that the sizes of the effects found in these studies have tended to be small, suggesting that factors other than communication play a role in the newcomer transition process (cf. Dean & Wanous, 1984; Dugoni &

Ilgen, 1981; Premack & Wanous, 1985; Reilly, Tenopir, & Sperling, 1979; Wanous, 1980; Wanous & Colella, 1990; Youngblood, Mobley, & Meglino, 1983).¹

Although realistic job previews have generally been successful, there is some disagreement over the exact mechanisms through which they operate, and several of those mechanisms may be important to the process (Meglino, DeNisi, Youngblood, & Williams, 1988). Fortunately, a number of the proposed mechanisms seem relevant to the employees of companies involved in mergers and acquisitions. In fact, although job previews have generally been used to reduce overly optimistic expectations, some authors have suggested (Breaugh, 1983; Louis, 1980) that they can also function effectively to raise overly pessimistic expectations like those likely to occur during mergers and acquisitions. Meglino and colleagues (1988) provided some data supporting that suggestion. Realistic job previews appear to work by serving two functions important to employees entering new jobs: they reduce uncertainty by providing realistic information about the jobs, and they communicate to the employees that the organization they are entering cares about them and can be trusted (Dugoni & Ilgen, 1981; Meglino et al., 1988; Schein, 1968). Clearly, those functions are important to employees facing mergers and acquisitions as well. Providing realistic information will provide employees with a basis for action other than rumors and thus should reduce uncertainty, and the communication process, which symbolizes an organization's concern for its employees, elicits increased commitment.

FOCUS OF THE PRESENT STUDY

As noted above, although there have been many suggestions that mergers and acquisitions are a source of uncertainty for employees, there are no data to support this suggestion. Therefore, one goal of the present study was to empirically determine if mergers and acquisitions activity does lead to uncertainty and its associated dysfunctional outcomes. Assuming that was the case, we also designed the present study to test the effectiveness of a communication program based on the model of realistic job previews. We intended the study to answer the question of whether such a program could mitigate the expected negative effects of mergers and acquisitions on employees.

The study was a longitudinal field experiment designed to provide a clear picture of the effects over time of both mergers and acquisitions and a communications program we called a realistic merger preview. Data were collected in two plants, an experimental plant in which the preview was introduced and a control plant in which the merger was managed more traditionally. We collected data at four points: before the impending merger was announced; following the announcement of the merger but before the implementation of the preview in the experimental plant; three days after

¹ Premack and Wanous (1985) is a meta-analysis.

the introduction of the preview; and four months later. Thus, it was possible to test the following hypotheses:

Hypothesis 1: The announcement of a merger will result in increases in uncertainty, stress, absenteeism, and turnover among the employees of an organization and decreases in their job satisfaction, commitment, intentions to remain, self-rated performance, and perceptions of the organization's trustworthiness, honesty, and caring.

This hypothesis simply tests the various negative effects mergers are supposed to have on employees. We predicted that those effects would emerge in both plants immediately following the merger announcement. To test the effectiveness of a realistic communications program in softening the negative impact of a merger, we hypothesized that:

Hypothesis 2: The institution of a realistic merger preview program will lower levels of uncertainty and dysfunctional outcomes.

This hypothesis does not suggest that a realistic merger preview will eliminate the problems associated with a merger, only that it will enable employees to deal with those problems better and so make the problems less severe. Finally, although there are no data to support hypotheses concerning long-term effects of realistic merger previews—and only limited support for the existence of long-term effects of realistic job previews (Meglino et al., 1988)—it seemed reasonable to test the following exploratory hypothesis:

Hypothesis 3: Over time, levels of uncertainty and its dysfunctional outcomes will continue to increase in the absence of a realistic merger preview but will stabilize or decrease after such a preview has been implemented.

METHODS

Overview of the Merger Situation

The research was conducted in two plants engaged in light manufacturing belonging to one of two merging Fortune 500 companies. Both firms sold diverse products and served diverse markets and were structured divisionally. The major impetus behind the merger was the belief of the firms' chief executive officers (CEOs) that considerable strategic advantages could be created by combining complementary product lines, sharing sales and distribution for certain product lines, and eliminating redundant functional and staff employees and facilities in a number of divisions. The merger would have a direct effect on only three divisions; the other divisions of the two firms, which were engaged in businesses unrelated to each other, would remain separate since no competitive advantages could be created by combining them.

The negotiations that took place between the CEOs of the two firms, characterized as friendly and cooperative by those involved, took approximately six months to complete. Both CEOs were committed to implementing

the merger with as few adverse effects on their organizations as possible. It was decided that the CEO of one of the companies (the one participating in this study) would become CEO of the combined firm, and the CEO of the other firm was to become its president and chief operating officer. Other staffing decisions concerning members of the top management team had not yet been completed by the end of the study.

Data were collected from two plants in a division directly affected by the merger. We collected data with the assistance of the firm's vice president of human resources. We did not collect data from the other firm being merged because we planned the study before the actual merger agreement was signed. Involving the other firm prior to the signing would have been premature, and involving it afterward would not have provided us with the needed premerger baseline data. Moreover, time constraints created by the merger made the participation of the second firm unfeasible after the closing of the deal.

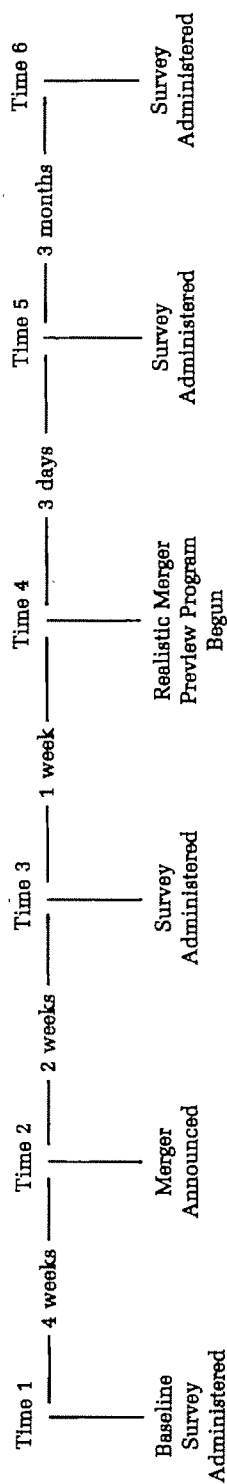
Four criteria guided selection of the actual plant sites for data collection. First, the sites had to be among those that the merger would affect so that the employees would be likely to react to it. Second, the sites had to have relatively few employees since top management wished to keep the study isolated from the larger employee population. Third, it was critical that the sites be matched on as many dimensions as possible so that reasonable comparisons could be made; and fourth, the sites needed to be geographically distant from each other to avoid any contamination of effects between plants.

Decisions made during negotiations suggested that the merger would directly affect the two plants chosen. One plant was located in the Midwest and the other in the Southwest. The two produced the same products and had approximately the same number of employees, management structures and systems, personnel practices, and volume of output. Neither plant was unionized.

The study was initiated after the vice president of human resources agreed to the study design, and both the company's CEO and the manager of the division containing the two plants gave their approval and commitment. Employees at one plant (chosen by a coin flip) received a realistic merger preview, and employees at the other received information that the organization typically gave plant employees when organizational changes occurred. Data were collected at four time points as Figure 1 illustrates.

At time 1, four weeks before the announcement of the merger, a psychologist reporting to the vice president of human resources administered an employee survey to employees in both plants. Participation in the survey, which resembled a number of similar surveys the organization had conducted in the previous five years, was voluntary. Thus, there was no reason for any employee to view it as unusual. The survey was conducted on company time, and confidentiality was assured. At the time of this administration, there was no reason for employees to even suspect that the company

FIGURE 1
Timeline of Major Events



was planning a merger. Merger negotiations had been secret and, with both plants quite distant from the corporate offices, it was very unlikely that any hint of the impending merger could have leaked out. As an added precaution, however, we interviewed 30 employees from each plant after the merger was announced. The interviews revealed that none of these employees suspected the merger at the time of the first administration of the survey.

On the day that the company released the merger announcement to the press (time 2), all employees of the company received a letter from the CEO informing them of the merger. Top management was careful to insure that the letter reached employees before they read about the merger in a newspaper. The letter informed employees that the merger agreement had been signed and that the primary motivation for the merger was to improve the competitive position of both firms by combining complementary product lines and achieving economies of scale. The letter also stated that doing so would require the firms to share distribution and sales forces for certain products and that redundant facilities and jobs would have to be eliminated. The letter provided no specific details regarding individuals or work units.

At time 3, two weeks after the merger announcement, the survey used at time 1 was administered again. This administration permitted an assessment of the announcement's effects on employees. We chose the two-week interval to provide sufficient time for employees to react to the announcement. One week after the second survey administration (time 4), we began the realistic merger preview program (described in detail below) at one plant, hereby called the experimental plant. Employees at the other site, the control plant, received only the type of information the organization normally distributed in such circumstances.

Three days after the beginning of the preview program—ten days after the second survey administration—there was a third survey administration. Data from this collection point (time 5) allowed assessment of the short-term effects of the realistic merger preview intervention. Finally, a fourth survey administration (time 6) three months after time 5 allowed us to assess the longer-term effects of the intervention. After time 5, the manager of the control plant saw that employee morale was declining rapidly and became alarmed. Although no data had yet been analyzed, the vice president of human resource's perception that the preview had been effective in minimizing employee trauma in the experimental plant led to its immediate introduction in the control plant. Because of work demands and time constraints created by the merger, we collected no further data in either plant.

Respondents

The experimental plant had 126 employees, and the control plant had 146. Respondents to the first three administrations of the survey numbered 82 in the experimental plant and 86 in the control plant. Two employees from each plant quit their jobs and a number of employees withdrew from the study before the last administration, leaving 75 employees in the experimental plant and 72 employees in the control plant for the fourth admin-

istration of the survey. The average age of the respondents was 31.7 years; their average number of years with the company was 9.6; and 70 percent were men.

Data for employees responding all four times were compared to data for those who dropped out before the last administration. We made these comparisons at each of the first three administrations using *t*-tests. No significant differences emerged, suggesting that nonrespondent bias in the group of respondents to the fourth survey was not present in any variable measured. Further, there were no significant differences in age, years employed by the company, or gender between employees who participated in the study and those who did not participate in any part of it.

Experimental Conditions

Realistic merger preview plant. In addition to the letter from the CEO, employees in the experimental plant received specific information about how the merger would affect them immediately after that information became available. We considered two factors in designing the preview: the information to be communicated and the medium for delivering it.

Information was chosen in light of the company's top management's intentions to (1) provide employees with frequent, honest, and relevant information about the merger, (2) handle employees fairly, and (3) answer questions and concerns the employees might have to the fullest extent possible. Employees received information and answers to questions concerning layoffs, transfers, promotions and demotions, and changes in pay, jobs, and benefits that would take place in their work units. It is important to note, however, that although decisions regarding these issues had been made and announced, none had actually been implemented during the duration of the study. Thus, it was impossible for us to determine whether management lived up to its intentions to be fair and honest.

Following recommendations by practitioners, we chose three media to facilitate two-way communication between management and employees. The first was a merger newsletter, which was sent to each employee twice a month. The newsletter detailed the organizational changes that the merger had created. It also provided responses to questions solicited from employees. The first newsletter came out the day that the realistic merger preview program began; the questions answered had been solicited two days earlier. The second communication medium was a telephone hotline answered during work hours by a personnel manager who continually received updated information from the vice president of human resources. The hotline manager did not provide answers to specific questions concerning individual employees but only answers to questions about general organizational changes, whether they had appeared in the newsletter or not. After work hours, employees calling the hotline reached an answering machine. Answers to questions the personnel manager could not answer or that were left on the answering machine were posted on bulletin boards around the plant, and most of the answers also appeared in the next newsletter. Super-

visors informed employees about the hotline and how it worked two days before its inception, and the newsletter gave information on how to use it. Hotline questions focused on (in descending order of frequency): layoffs and severance benefits, other benefits, transfers, integration plans, compensation, and background information on the merger.

Finally, the experimental plant's manager met weekly with the supervisors and employees of each of the eight departments in the plant. Each meeting was held with only one department so that changes affecting that department could be specifically addressed. Each meeting lasted about one hour. Weekly briefings prepared jointly by the plant manager and the vice president of human resources supplemented these meetings. The briefings were used to maintain communication consistency and accuracy in the plant. The briefings generally addressed background information on the merger, layoffs and severance benefits, transfers, compensation and benefits, and implementation-integration plans for the combining firms.

Throughout the study, the plant manager also met personally with individual employees whenever a decision affecting them was made. We had no access to this confidential information, but we were assured that none of the information given or decisions made during these meetings contradicted the formal communications. In addition, employees met with their supervisors weekly to discuss work issues; such meetings had been a normal practice prior to the merger announcement.

Control plant. Employees in the control plant did not receive any formal communications concerning the merger other than the initial letter from the CEO. The plant manager, who was not aware of the realistic merger program in the experimental plant, was simply told that information would be coming as soon as it was available. This approach to communication had been typical of the organization for past organizational changes. Given previous practices and the short duration of the study (just over three months), we did not see this approach as imposing an unusual hardship on employees. Employees in this plant did, however, meet with their supervisors weekly to discuss work issues, as they had prior to the merger.

Measures

The survey administered at times 1, 3, 5, and 6 provided data on perceived uncertainty, satisfaction, intentions to remain with the organization, global stress, self-reported performance, and perceptions of the company's trustworthiness, honesty, and caring. The survey given at time 6 also included two manipulation checks. We obtained data on absenteeism and turnover from company records.

Perceived uncertainty. We measured this variable using a 21-item scale, which appears in the Appendix. The items covered different aspects of work life typically affected during major corporate restructurings. Respondents rated the extent of uncertainty associated with each aspect. The work aspects covered were those identified in previous research (Schweiger et al., 1987)

as sources of uncertainty during mergers and acquisitions. The items are also similar to those contained in measures of job insecurity (Ashford et al., 1989). A preliminary principal-component varimax-rotated factor analysis on time 1 data revealed that one general factor accounted for a significant portion of the explained variance on this measure.² We deemed this factor adequate on the basis of analyses of eigenvalues and Cattell's scree test (Weiss, 1971). Coefficient alphas for times 1, 3, 5, and 6 were .91, .95, .97, and .94. The results of the factor analysis, the high internal consistency reliabilities, and the support found for hypothesized relationships (discussed below) suggest that the scale used here is a valid and reliable measure of perceived uncertainty.

Global stress. We used a 14-item scale developed by Cohen, Karmarck, and Mermelstein (1983) to measure global stress. The items ask respondents to think about their feelings and reactions during a specific time period. For the present study, the time span differed for each administration and was defined as the time elapsed since the last administration. Employees rated their feelings and thoughts for each item on a five-point scale. Example items include: "In the last [period], how often have you been upset because of something that happened unexpectedly?" and "In the last [period], how often have you felt that you were on top of things?" Coefficient alphas for times 1, 3, 5, and 6 were .81, .86, .85, and .87.

Job satisfaction. A 5-item scale developed by House, McMichael, Wells, Kaplan, and Landerman (1979) was used to assess global satisfaction rather than satisfaction with any particular facet of a job. We used a global measure to avoid any potential overlap in item sampling with the uncertainty scale, which focuses on specific aspects of work life. Employees were asked to rate how satisfied they were on a three-point scale. Each item had a different anchor. Examples include: "In general, how satisfied would you say you are with your position in the organization?" and "Overall, I am satisfied with my position in the organization." Coefficient alphas for times 1, 3, 5, and 6 were .95, .96, .96, and .98.

Organizational commitment. This variable was measured using the 15-item scale developed by Porter and Smith (1970). Employees used a five-point scale to rate their agreement or disagreement with each item. Items measured the extent of employees' pride in working for the organization, perceived value congruence with the organization, and willingness to exert extra levels of effort on behalf of the organization, among other constructs. Coefficient alphas for times 1, 3, 5, and 6 were .89, .90, .91, and .88.

Perceptions of the company's trustworthiness, honesty, and caring. A 3-item scale developed by Meglino and colleagues (1988) was used to measure this variable. Employees indicated agreement or disagreement with each item on a five-point rating scale. Items assessed the extent to which the

² The factor analysis is available upon request.

company could be trusted, was honest in dealing with its employees, and cared what happened to employees. Coefficient alphas for times 1, 3, 5, and 6 were .91, .81, .86, and .90.

Intentions to remain with the organization. This variable was measured using a 5-item scale developed by Meglino and colleagues (1988) that assesses thoughts about leaving or staying as well as actual intentions to leave or stay. Employees used a seven-point scale to respond to items asking them to indicate their intentions to remain with the company, their thoughts about leaving, and their intentions to make a career in the company. The coefficient alphas at times 1, 3, 5, and 6 were .86, .89, .89, and .91.

Performance. Respondents rated their performance on a single-item scale by comparing themselves to others in the same job, with 1 for "way below average" and 5 for "way above average."

Absenteeism. We operationally defined this variable as the number of each individual's excused and unexcused absences divided by the number of work days. Absenteeism for the baseline measure (time 1) was based on records for the 60 days before the merger announcement, and absenteeism for the remaining periods was based on records covering the actual days between survey administrations. To determine whether there were cyclical trends in absenteeism, we examined data for one year prior to the study. No significant differences in absenteeism rates among the four equivalent study periods emerged, so it appears unlikely that changes in absenteeism were due to cyclical trends.

Turnover. This variable was simply defined by whether or not an individual voluntarily left the company. Although data from the intentions measure indicated that numerous employees were thinking about leaving, only two employees from each plant actually quit during the time of the study. There were no layoffs during this time. To some extent, local labor market conditions influenced the low turnover rates—although intentions to leave were high, external opportunities for employment were not very good. Since there was almost no variance in actual turnover, we omitted it from subsequent analyses.

Manipulation check. To determine whether employees were actually aware of the realistic merger preview program, we asked two questions in the survey administered at time 6: "How often did management communicate about events related to the merger?" (1 = never, 5 = frequently) and "How useful to you was the information that management communicated about events related to the merger?" (1 = useless, 5 = very useful).

RESULTS

To assess whether the manipulation was effective, we used *t*-tests, finding that respondents in the experimental plant said they received significantly ($p < .05$) more frequent information than those in the control plant ($\bar{x} = 4.3$, *s.d.* = .87 vs. $\bar{x} = 2.4$, *s.d.* = .75). The former also said their information was more useful ($\bar{x} = 3.5$, *s.d.* = 1.05 vs. $\bar{x} = 2.3$, *s.d.* = .86).

We concluded that the employees in the experimental plant effectively received the realistic merger preview program.

Table 1 presents the means and standard deviations for all dependent measures found in both plants for each survey administration (times 1, 3, 5, and 6). Table 2 provides an intercorrelation matrix for all dependent variables measured at those times (a complete intercorrelation matrix for all dependent variables across all time periods is available upon request).

Hypothesis 1 predicts that, following the announcement of a merger, perceived uncertainty and dysfunctional outcomes will increase. Because intercorrelations among the dependent variables were high, we conducted multivariate *t*-tests in a multivariate analysis of variance (MANOVA) to compare responses from time 1 and time 3 for the two plants, using data from all employees who responded at both those times. Test statistics associated with these analyses indicated significant multivariate effects for both the experimental and control plant. Table 3 summarizes results.

For both plants, subsequent univariate (ANOVA) tests indicated significant increases in global stress, perceived uncertainty, and absenteeism; significant declines in job satisfaction, commitment, and perceptions of the company's trustworthiness, honesty, and caring; and no significant changes in self-reported performance. There was also a significant decline in intentions to remain with the organization for the experimental plant. Thus, the data provide strong support for Hypothesis 1: the announcement of the merger did seem to have a deleterious effect in both plants.

Hypotheses 2 and 3 were tested together in a series of multivariate and univariate analyses that longitudinally compared data for the two plants following the announcement of the merger. In order to assess the short- and longer-term effects of the realistic merger preview program, we compared differences between the two plants at times 5 and 6, the two survey administrations that occurred after the preview was introduced, using data from time 3 as covariates. Although there were no significant differences between the plants at time 3 (right after the merger announcement), we used these data as covariates to insure that any differences detected at the later survey administrations were not due to differential reactions to the merger announcement. Also, we saw time 3 as the appropriate covariate because we were interested in differences between the plants following the introduction of the preview program.

A multivariate analysis of covariance (MANCOVA) conducted on time 5 data with the time 3 covariates indicated a significant difference between the plants at time 5; Table 4 summarizes results. Univariate covariate analyses indicated that the experimental plant employees were significantly lower on perceived uncertainty and significantly higher on job satisfaction, commitment, and perceptions of the company's trustworthiness, honesty, and caring.

A similar MANCOVA to assess the longer-term effects of the realistic merger preview was conducted on the data from time 6, with the data from time 3 serving as covariates. The multivariate effect was significant. Subse-

TABLE 1
Means and Standard Deviations for Dependent Measures^a

Variables	Time 1		Time 3		Time 5		Time 6	
	Control Plant	Experimental Plant	Control Plant	Experimental Plant	Control Plant	Experimental Plant	Control Plant	Experimental Plant
Global stress	2.50 (0.35)	2.48 (0.39)	3.04 (0.42)	2.91 (0.45)	3.05 (0.40)	2.93 (0.34)	3.32 (0.58)	2.91 (0.41)
Uncertainty	1.75 (0.37)	1.60 (0.39)	3.45 (0.66)	3.31 (0.68)	4.03 (0.64)	3.35 (0.78)	4.28 (0.78)	3.39 (0.76)
Job satisfaction	2.52 (0.53)	2.38 (0.49)	2.29 (0.65)	1.94 (0.57)	1.94 (0.63)	2.05 (0.58)	1.81 (0.70)	2.07 (0.56)
Commitment	3.24 (0.57)	3.08 (0.57)	3.04 (0.61)	2.88 (0.52)	2.82 (0.71)	2.85 (0.51)	2.72 (0.65)	2.89 (0.54)
Company's trustworthiness, honesty, and caring	3.28 (0.79)	3.07 (0.79)	2.97 (0.75)	2.64 (0.76)	2.50 (0.88)	2.55 (0.76)	2.23 (0.80)	3.00 (0.83)
Intentions to remain	5.82 (0.92)	5.65 (1.15)	5.52 (1.05)	5.23 (1.13)	5.06 (1.11)	5.13 (1.14)	4.84 (1.09)	4.92 (1.18)
Performance	3.33 (0.99)	3.37 (1.09)	3.23 (0.92)	3.38 (0.86)	2.92 (0.82)	3.09 (0.78)	2.59 (1.04)	3.37 (0.84)
Absenteeism	0.00 (0.01)	0.01 (0.01)	0.03 (0.05)	0.02 (0.05)	0.01 (0.05)	0.05 (0.20)	0.01 (0.02)	0.01 (0.01)

^a Standard deviations are in parentheses. Statistics for times 1, 3, and 5 are for the full set of 86 control plant and 82 experimental plant employees, whereas for time 6 they are for the restricted set of 72 and 75 employees. For all times 1, 3, and 5 comparisons with time 6 data, we used the restricted set. The means and standard deviations for the restricted set are available upon request.

TABLE 2
Zero-Order Correlations Among Dependent Variables

Variables	Correlations ^a						
	1	2	3	4	5	6	7
Times 1 and 3							
1. Uncertainty		.28	.34	.27	.28	.36	.14
2. Global stress	.32		.11	.14	.11	.14	-.07
3. Job satisfaction	.28	.15		.31	.23	.27	.08
4. Commitment	.34	.19	.24		.47	.34	.06
5. Company's trustworthiness, honesty, and caring	.22	-.09	.19	.43		.27	-.04
6. Intentions to remain	.29	.19	.31	.39	.21		.09
7. Performance	-.09	.04	-.05	.11	.08	.06	
Times 5 and 6							
1. Uncertainty		.19	.30	.22	.36	.21	.21
2. Global stress	.34		.11	.16	.17	.18	.14
3. Job satisfaction	.23	.19		.31	.26	.37	.10
4. Commitment	.31	.13	.27		.29	.42	-.08
5. Company's trustworthiness, honesty, and caring	.29	-.05	-.14	.34		.29	.11
6. Intentions to remain	.36	.08	.22	.31	.15		.19
7. Performance	.07	.05	-.09	.09	.03	.11	

^a Correlations for times 1 and 5 are above the diagonals, and those for times 3 and 6 are below.

quent univariate tests indicated that the employees of the experimental plant were significantly lower on global stress and perceived uncertainty and significantly higher on job satisfaction, commitment, perceived trustworthiness, honesty, and caring, and self-reported performance.

An additional analysis compared the two plants at time 6, with data from time 5 serving as covariates, to provide a better look at the incremental changes in the effects of the preview program over time. The multivariate effect was again significant. Univariate effects indicated that the employees of the experimental plant were significantly lower on perceived uncertainty and significantly higher on job satisfaction, commitment, perceived trustworthiness, honesty, and caring, and self-reported performance. Thus, the realistic merger preview appeared to stabilize the level of dysfunctional outcomes, and this effect continued over time. In fact, the effects found in the fourth survey administration were stronger than those found for the third administration.

Finally, to provide a clearer picture of changes over time, we plotted changes over all time periods for each plant for representative dependent variables (Figures 2-4).

Analyses for differences between times 3 and 5 were especially enlightening. The multivariate effect was significant for the control plant but not for the experimental plant. Univariate effects for the control plant indicated a significant increase in perceived uncertainty and absenteeism and signifi-

TABLE 3
Summary of Univariate and Multivariate Results for Longitudinal Effects

Analyses	Time 1 to Time 3		Time 3 to Time 5		Time 5 to Time 6	
	Control Plant	Experimental Plant	Control Plant	Experimental Plant	Control Plant	Experimental Plant
MANOVA	58.82***	59.78***	8.50***	1.05	0.85	2.31*
ANOVA						
Global stress	12.51***	9.68***	1.30	0.86	4.41*	1.23
Uncertainty	24.93***	24.93***	15.08***	0.95	2.01	1.01
Job satisfaction	15.76***	9.46***	41.73***	2.20	0.95	0.89
Commitment	16.81***	21.16***	1.16	1.01	1.95	0.76
Company's trustworthiness, honesty, and caring	22.94***	29.48***	47.61***	1.81	4.93*	13.54***
Intentions to remain	17.47**	21.53***	18.66***	2.28	2.41	2.01
Performance	1.38	1.06	8.35***	1.82	4.36*	5.95*
Absenteeism	7.90**	8.53**	9.64***	1.71	1.84	3.95*
N	82	86	82	82	75	72

* $p < .05$ ** $p < .01$ *** $p < .001$

TABLE 4
Summary of Univariate and Multivariate Results
for Comparisons Between Plants

Analyses	Time 5 with Time 3 Covariate	Time 6 with Time 3 Covariate	Time 6 with Time 5 Covariate
MANCOVA	11.77***	7.79***	6.24***
ANCOVA			
Global stress	2.89	12.20***	2.22
Uncertainty	94.55***	35.21***	13.49***
Job satisfaction	7.60***	5.15*	5.09*
Commitment	9.80***	3.84*	4.65*
Company's trustworthiness, honesty, and caring	9.17***	13.61**	36.23***
Intentions to remain	1.51	1.14	1.41
Performance	1.30	2.20	12.33***
Absenteeism	2.01	1.89	2.11
N	168	147	147

* $p < .05$

** $p < .01$

*** $p < .001$

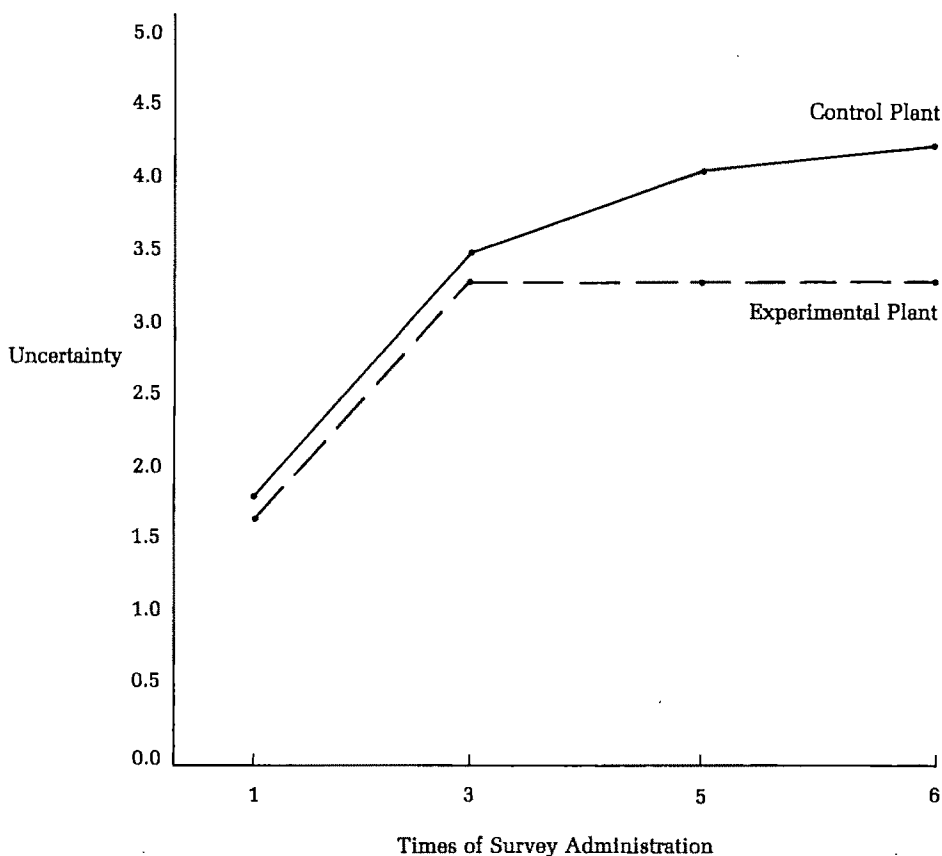
cant decreases in satisfaction, perceptions of the company's trustworthiness, honesty, and caring, intentions to remain, and self-reported performance. Further, analysis of differences between times 5 and 6 indicated a significant multivariate effect for the experimental plant that was due to significant increases in perceptions of the company's trustworthiness, honesty, and caring and self-reported performance and a significant decrease in absenteeism. The multivariate effect for the control plant in this analysis was not significant, although there were significant declines in perceived trustworthiness, honesty, and caring and self-reported performance and a significant increase in global stress.

Taken together, these results provide strong support for the hypothesized stabilizing effect of the realistic merger preview over both the short term and the longer term. It is also interesting to note that mean levels of performance and perceptions of the company's trustworthiness, honesty, and caring in the experimental plant actually began to return to premerger levels—the differences in these variables at times 1 and 6 were not significant for that plant.

DISCUSSION

The results of the present study represent an important step in understanding the negative effects of mergers (and, presumably acquisitions) on a firm's human resources, as well as the beginning of an understanding of how to ameliorate those effects. First, these results provide strong empirical evidence that mergers do have the negative impact that scholars have suggested they have. Uncertainty appears to increase, and with that increase

FIGURE 2
Longitudinal Effects of Merger and Realistic Merger Preview on
Uncertainty

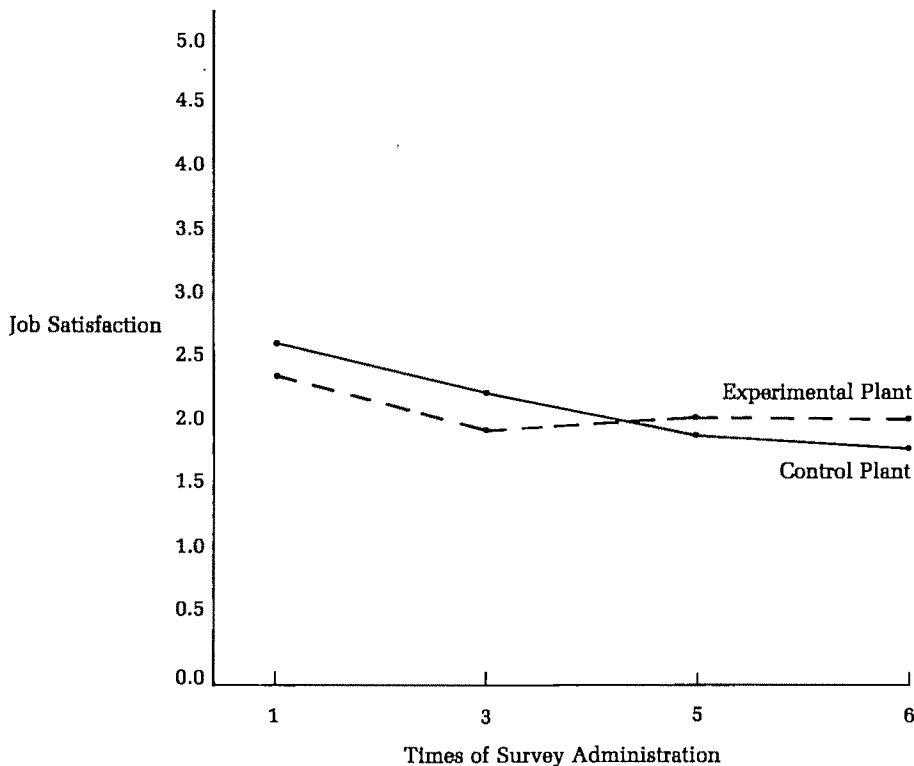


there seems to be a rise in stress and a decrease in satisfaction, commitment, intentions to remain with an organization, and perceptions of the organization's trustworthiness, honesty, and caring. Less consistent support was found for the hypothesized effects on performance and absenteeism.

Second, the present results suggest that realistic communications during a merger process in the form of a realistic merger preview can help employees get through the process. Specifically, realistic communications can help employees cope with the uncertainty of the situation and so insulate themselves from some of the associated dysfunctional outcomes. It is important to note here that the negative effects of mergers and acquisitions activity do not seem to simply go away with time but seem, instead, to get more serious. Therefore, the effects of the help with coping and insulation provided by the preview become more pronounced over time.

Few of the announced changes had come to pass during the duration of the study, so the present results say more about employees' ability to deal

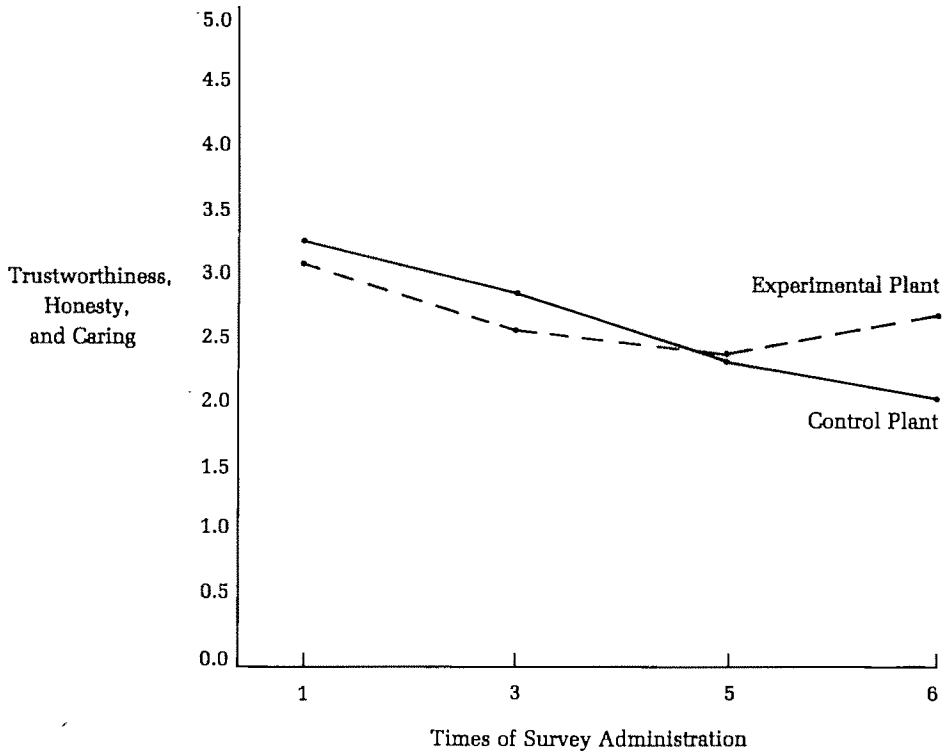
FIGURE 3
Longitudinal Effects of Merger and Realistic Merger Preview on Job Satisfaction



with anticipated changes than about actual changes. Nonetheless, communicating the organization's intentions did appear to reduce uncertainty for the employees of the experimental plant and increase their perceptions that the company was trustworthy, honest, and caring. Thus, we would expect the implementation of changes to have less impact in the plant in which the preview program was instituted. In fact, there is reason to believe that the realistic merger preview would have an increasingly beneficial effect as the changes were made and the employees saw for certain that the organization had been forthcoming with them (cf. Meglino et al., 1988). Furthermore, studies in social justice have indicated that even people who are unhappy about the outcome of a process will have less dissatisfaction and fewer dysfunctions than they might otherwise if they understand the process through open communications and see that it was fair (e.g., Greenberg, 1987; Greenberg & Folger, 1983).

The changes that occurred in the two plants over time are particularly interesting. In the control plant, changes continued to be significant and negative throughout the entire study. Rather than diminishing, the problems

FIGURE 4
Longitudinal Effects of Merger and Realistic Merger Preview on Perceived Trustworthiness, Honesty, and Caring of the Company



associated with the announced merger continued to reverberate throughout the plant. The situation in the experimental plant was quite different. Immediately following the merger announcement, a change for the worse occurred, much as in the control plant. Once the realistic merger preview program was instituted, though, the situation in the plant began to stabilize. Uncertainty and its associated outcomes did not decline, but they stopped increasing, and over time, perceptions of the company's trustworthiness, honesty, and caring and self-reported performance actually began to improve and move back towards their preannouncement levels. Thus, a realistic merger preview seems to function at least as an inoculation that makes employees resistant to the negative effects of mergers and acquisitions, and its effects may go beyond that.

Unfortunately, it was not possible to extend the present study over a longer period of time, so further studies are needed to examine how the process outlined here continues to develop. Specifically, future studies should examine whether incipient trends of improvement in experimental plants continue so that levels of all variables of interest actually return to their premerger levels, demonstrating reversal of the damage caused by an

initial merger announcement. Additionally, future studies should examine the progress of events in control plants. An examination of the changes in the control plant in the present study revealed that commitment and intentions to leave did not change significantly from time 5 to time 6. Perhaps these effects had bottomed out, and over a longer period of time, other effects might do the same.

Such speculation about longer-term effects are especially interesting in light of the fact that, despite a reasonably high level of stated intentions to leave, actual turnover was negligible during the course of the study. Clearly, we would expect that to change if data were collected over a period of time long enough to allow people to find alternative employment and act on their intentions. If actual turnover did increase, however, we would expect the employees who remained to be the most satisfied and committed (as well as the least mobile, perhaps). In the long run, the mean levels of satisfaction and commitment in the control plant would rise simply because of the higher attrition rates among the less satisfied and committed, so the situation in that plant might appear to improve when it actually had not. It is important to note that time horizon is a major part of research on mergers and acquisitions, as Marks and Mirvis (1983) and Buono and Bowditch (1989) noted; the latter suggested that as much as two years may be needed before the full impact of mergers and acquisitions activity can be assessed.

The results of the present study also raise some interesting questions about the mechanisms underlying interventions similar to realistic merger previews. The present results support the importance of realistic communications as a means of reducing uncertainty, but they also suggest that the symbolic value of such communications may be as important as their actual content. Organizations that communicate caring and concern to employees, whatever the communication's informational content, may be able to expect increased employee commitment. That commitment may be critical during a merger process (Schweiger & Walsh, 1990) and may allow management more flexibility in adapting to changes rather than the reduced flexibility that some authors have suggested follows realistic communication (e.g., Eisenberg & Witten, 1987). An interesting question that remains is whether the actual content of communications makes any difference. In this study, the mere process of communicating with employees may have been sufficient to yield the changes noted. It is possible that even if the content of communications were less accurate than it was here, or even inaccurate, the program would have been just as effective as long as it made employees feel that the organization cared about them. Future studies should be designed to investigate more fully the symbolic role of realistic communications to determine its importance relative to the importance of the content itself.

Several caveats should also be noted. First, although we drew upon the literature on realistic job previews for the rationale and approach used here, the present intervention differed from typical job preview programs in several respects. The content of the communications was, of course, different since the present intervention dealt with the uncertainty surrounding a

merger rather than that surrounding joining a new organization. Perhaps more critically, though, the realistic merger preview differed from most realistic job previews in both the mode and frequency of communications. A typical job preview involves only one communication, usually a film or videotape. The program used here involved face-to-face meetings and other two-way communications and extended over several months. These differences might well limit the extent to which the present results can be generalized back to the job preview literature, and future studies should examine the impact of these differences carefully.

A second caveat relates to the fact that the organization in the present study was involved in a friendly merger and that the anticipated changes included selective rather than massive layoffs. A hostile takeover or the announcement of more widespread layoffs might well elicit different responses from employees, and a realistic merger preview might be less effective in helping to deal with those responses. Moreover, the CEO of the company in which the study was conducted was to retain control of the post-merger organization, making changes in organizational culture less likely following the merger than they would have been with a change of leadership and so easing the transition to a new organization.

Third, the limited duration of the study prevented us from knowing whether the communicated intentions were ever implemented. We could never directly examine whether management behaved fairly and honestly. Finally, we examined organizational units that were going to be fully integrated with units of the combining firm. The responses of employees in units that are to be integrated may differ from the responses of employees in units that are to be left alone (Schweiger, Napier, & Csiszar, 1989). There is clearly a need for studies that consider the various contingency factors that surround mergers and acquisitions (Bastien & Van de Ven, 1986; Chatterjee, 1986; Napier, 1989; Schweiger & Ivanevich, 1987; Schweiger & Walsh, 1990; Shrivastava, 1986).

On a different note, the present study makes salient certain ethical dilemmas facing researchers studying certain organizational phenomena.³ As was noted here, the procedures followed in the control plant were those the organization had used to communicate changes in the past. Also, some previous research suggested that realistic communications should be avoided because they might scare off valued employees. Nonetheless, we judged it unlikely that the realistic merger preview would have a negative impact on the attitudes and perceptions of the employees. Thus, the experimental design employed here actually deprived employees in the control plant of a potentially beneficial intervention. Was causing that deprivation ethically responsible? We think so, given that the procedures followed in the control plant were those the organization would have followed if the research had not been conducted. But what if researchers interested in comparing the

³ Mirvis and Seashore (1979) discuss such dilemmas.

effects of the content and the symbolic value of communications needed to deprive a control plant of potentially important information about a planned merger? It is not our intent here to solve such ethical dilemmas, only to warn other researchers that these questions do arise and should receive careful consideration.

In conclusion, despite its limitations the present study represents a step in explaining how mergers and acquisitions affect employees. Organizational decisions to engage in such activities usually depend on strategic factors like the compatibility of product lines and potential access to new markets. The results of the present study make it clear, however, that such activities also have an impact on employees. Left unchecked, employee reactions to a merger or an acquisition could be extremely costly to an organization and could easily undermine aspects of the corporate strategy that led to the activity in the first place. We hope the present results also suggest that realistic communications can help employees cope with the effects of mergers and acquisitions and so reduce the negative impact these activities can have on organizational effectiveness. The present results indicate some promise for the realistic merger preview approach, and we hope they will lead to further research to determine how fully that promise can be realized.

REFERENCES

- Ashford, S. J., Lee, C., & Bobko, P. 1989. Content, causes, and consequences of job insecurity: A theory-based measure and substantive test. *Academy of Management Journal*, 32: 803–829.
- Bastien, D. T. 1987. Common patterns of behavior and communication in corporate mergers and acquisitions. *Human Resource Management*, 26(1): 17–34.
- Bastien, D. T., & Van de Ven, A. W. 1986. *Managerial and organizational dynamics of mergers and acquisitions*. Strategic Management Research Center discussion paper no. 46, University of Minnesota.
- Breaugh, J. A. 1983. Realistic job previews: A critical appraisal and future research directions. *Academy of Management Review*, 8: 612–619.
- Buono, A. F., & Bowditch, J. L. 1989. *The human side of mergers and acquisitions*. San Francisco: Jossey-Bass.
- Buono, A. F., Bowditch, J. L., & Lewis, J. W. 1985. When cultures collide: The anatomy of a merger. *Human Relations*, 38: 477–500.
- Chatterjee, S. 1986. Types of synergy and economic value: The impact of acquisitions on merging and rival firms. *Strategic Management Journal*, 7: 119–140.
- Cohen, S., Kamarck, T., & Mermelstein, R. 1983. A global measure of perceived stress. *Journal of Health and Social Behavior*, 24: 385–396.
- Dean, R. A., & Wanous, J. P. 1984. Effects of realistic job previews on hiring bank tellers. *Journal of Applied Psychology*, 69: 61–68.
- Dugoni, B. L., & Ilgen, D. R. 1981. Realistic job previews and the adjustment of new employees. *Academy of Management Journal*, 24: 579–591.
- Eisenberg, E. M., & Witten, M. G. 1987. Reconsidering openness in organizational communication. *Academy of Management Review*, 12: 418–426.
- Gil, J., & Foulger, J. 1978. Managing a merger: The acquisition and the aftermath. *Personnel Management*, 10(1): 14–17.

- Graves, D. 1981. Individual reactions to a merger of two small firms of brokers in the reinsurance industry: A total population survey. *Journal of Management Studies*, 18: 89–113.
- Greenberg, J. 1987. A taxonomy of organizational justice theories. *Academy of Management Review*, 12: 9–22.
- Greenberg, J., & Folger, R. 1983. Procedural justice, participation and the fair process effect in groups and organizations. In: P. B. Paulus (Ed.), *Basic group processes*: 235–256. New York: Springer-Verlag.
- Hirsch, P. 1987. *Pack your own parachute*. Reading, MA: Addison-Wesley.
- House, J. S., McMichael, A. J., Wells, J. A., Kaplan, B. H., & Landerman, L. R. 1979. Occupational stress and health among factory workers. *Journal of Health and Social Behavior*, 20: 139–160.
- Ivancevich, J. M., Schweiger, D. M., & Power, F. R. 1987. Strategies for managing human resources during mergers and acquisitions. *Human Resource Planning*, 10(1): 19–35.
- Jemison, D. B., & Sitkin, S. B. 1986a. Corporate acquisitions: A process perspective. *Academy of Management Review*, 11: 145–163.
- Jemison, D. B., & Sitkin, S. B. 1986b. Acquisitions: The process can be the problem. *Harvard Business Review*, 64(2): 107–116.
- Jick, T. D. 1979. *Process and impacts of a merger: Individual and organizational perspectives*. Unpublished doctoral dissertation, Cornell University, Ithaca, NY.
- Louis, M. R. 1980. Surprise and sense making: What newcomers experience in entering unfamiliar organizational settings. *Administrative Science Quarterly*, 25: 226–251.
- Marks, M. L., & Mirvis, P. H. 1983. *Psychological consequences of a corporate acquisition and the factors that moderate them: A longitudinal study*. Paper presented at the 91st Convention of the American Psychological Association, Anaheim, CA.
- Marks, M. L., & Mirvis, P. 1985. Merger syndrome: Stress and uncertainty. *Mergers and Acquisitions*, 20(1): 70–76.
- Meglino, B. M., DeNisi, A. S., Youngblood, S. A., & Williams, K. J. 1988. Effects of realistic job previews: A comparison using "enhancement" and a reduction preview. *Journal of Applied Psychology*, 73: 259–266.
- Mirvis, P., & Marks, M. L. 1986. Merger syndrome: Management by crisis. *Mergers and Acquisitions*, 21(1): 50–55.
- Mirvis, P. H., & Seashore, S. E. 1979. Being ethical in organizational research. *American Psychologist*, 34: 766–780.
- Napier, N. K. 1989. Mergers and acquisitions, human resource issues and outcomes: A review and suggested typology. *Journal of Management Studies*, 26: 271–289.
- Napier, N. K., Simmons, G., & Stratton, K. 1989. Communication during a merger: Experience of two banks. *Human Resource Planning*, 12(2): 105–122.
- Porter, L. W., & Smith, F. J. 1970. *The etiology of organizational commitment*. Working paper, University of California, Irvine.
- Premack, S. L., & Wanous, J. P. 1985. A meta-analysis of realistic job preview experiments. *Journal of Applied Psychology*, 70: 706–719.
- Pritchett, P. 1985. *Making mergers work: A guide to managing mergers and acquisitions*. Homewood, IL: Dow Jones-Irwin.
- Reilly, R. R., Tenopir, M. L., & Sperling, S. M. 1979. Effects of job previews on job acceptance and survival of telephone operator candidates. *Journal of Applied Psychology*, 64: 218–220.
- Rentch, J., & Schneider, B. 1989. *Expectations for post-combination organizational life: A study of responses to merger and acquisition scenarios*. Working paper, Wright State University, Dayton, OH.

- Robino, D., & DeMeuse, K. 1985. Corporate mergers and acquisitions: Their impact on HRM. *Personnel Administrator*, 30(11): 47–61.
- Rosnow, R. L. 1980. Psychology of rumor reconsidered. *Psychological Bulletin*, 87: 578–591.
- Rosnow, R. L. 1988. Rumor as communication: A contextual approach. *Journal of Communication*, 38: 12–28.
- Rosnow, R. L., & Fine, G. A. 1976. *Rumor and gossip: The social psychology of hearsay*. New York: Elsevier.
- Schein, E. H. 1968. Organizational socialization and the profession of management. *Industrial Management Review*, 9: 1–16.
- Schweiger, D. M., & Ivancevich, J. M. 1985. Human resources: The forgotten factor in mergers and acquisitions. *Personnel Administrator*, 30(11): 47–61.
- Schweiger, D. M., & Ivancevich, J. M. 1987. *The effects of mergers and acquisitions on organizations and employees: A contingency view*. Paper presented at the national meeting of the Strategic Management Society, Boston.
- Schweiger, D. M., Ivancevich, J. M., & Power, F. R. 1987. Executive actions for managing human resources before and after acquisition. *Academy of Management Executive*, 1: 127–138.
- Schweiger, D. M., Napier, N. M., & Csiszar, E. R. 1989. *A model for implementing international mergers and acquisitions*. Paper presented at the Strategic Management Society Conference on Mergers, Acquisitions and Alliances, Paris.
- Schweiger, D. M., & Walsh, J. P. 1990. Mergers and acquisitions: An interdisciplinary view. In K. M. Rowland and G. R. Ferris (Eds.), *Research in personnel and human resource management*, vol. 8: 41–107. Greenwich, CT: JAI Press.
- Schweiger, D. M., & Weber, Y. 1989. Strategies for managing human resources during mergers and acquisitions: An empirical investigation. *Human Resource Planning*, 12(2): 69–86.
- Shirley, R. C. 1973. Analysis of employee and physician attitudes toward hospital merger. *Academy of Management Journal*, 16: 465–480.
- Shrivastava, P. 1986. Postmerger integration. *Journal of Business Strategy*, 7(1): 65–76.
- Sineta, M. 1981. Mergers, morale and productivity. *Personnel Journal*, 60: 863–867.
- Wanous, J. P. 1980. *Organizational entry*. Reading, MA: Addison-Wesley.
- Wanous, J. P., & Colella, A. 1990. Organizational entry research: Current status and future directions. In G. Ferris & K. Rowland (Eds.), *Research in personnel and human resources management*, vol. 7: 59–120. Greenwich, CT: JAI Press.
- Weiss, D. J. 1971. Further considerations in applications of factor analysis. *Journal of Counseling Psychology*, 18: 85–92.
- Youngblood, S. A., Mobley, W. H., & Meglino, B. M. 1983. A longitudinal analysis of the turnover process. *Journal of Applied Psychology*, 68: 507–516.

APPENDIX

To capture the uncertainty associated with different aspects of work life, we asked, "As you have thought about your future in the company, to what extent are you uncertain about the following?" Responses could range from 1, "never a source of uncertainty," to 7, "always a source of uncertainty."

1. Whether your pension plan will be changed
2. Whether you will have to relocate (transfer)
3. Whether you will get to work with the same colleagues
4. Whether you will have control over your job
5. Whether you will be laid off

6. Whether you will have enough information to do your job
7. Whether you will have to move to a new geographic location
8. Whether you will have influence over changes in your job
9. Whether you will have to take on more work than you are capable of handling
10. Whether you will be able to get promoted
11. Whether you will have to take a pay cut
12. Whether you will have to learn new job skills
13. Whether you will be forced to take a demotion
14. Whether you will get to work with people that you have become friends with
15. Whether you will be required to take on jobs that you have not been trained for
16. Whether there will be opportunities to advance in the company
17. Whether friends and colleagues lose their jobs
18. How performance will be measured
19. Whether the company will be a good place to work
20. Whether you will "fit" with the culture of the company
21. Whether the culture of the company will change

David M. Schweiger earned his D.B.A. degree in management at the University of Maryland; he is an associate professor in management at the University of South Carolina. His research interests include mergers and acquisitions and top-management-team decision making.

Angelo S. DeNisi is a professor of industrial relations and human resources in the Institute of Management and Labor Relations at Rutgers University. He received his Ph.D. degree in industrial/organizational psychology from Purdue University. His major research interests are cognitive processes in performance appraisal, job analysis, realistic job previews, and work values.

GENDER AND ORGANIZATIONAL PERFORMANCE: DETERMINANTS OF SMALL BUSINESS SURVIVAL AND SUCCESS

ARNE L. KALLEBERG

University of North Carolina at Chapel Hill

KEVIN T. LEICHT

Pennsylvania State University

In this study, we examined several hypotheses on how the survival and success of small businesses headed by men and women are related to industry differences, organizational structures, and attributes of owner-operators. We found that businesses headed by women were not more likely to go out of business, nor less successful, than those owned by men. Our analyses are based on data collected annually over a three-year period from an initial group of 411 companies in the computer sales and software, food and drink, and health industries in South Central Indiana.

Recent research on entrepreneurship, management, and organizations has underscored the importance of understanding better the conditions that promote business survival and success. Although organizational survival has been studied for many years (e.g., Mayer & Goldstein, 1961), research on this topic grew rapidly in the late 1970s and 1980s, largely as a result of an increase in business failures, bankruptcies, and hostile takeovers during that period (Cameron, Sutton, & Whetten, 1988: 5; Meyer, 1988; Whetten, 1987). The focus on survival contrasts with that of most research on organizational performance in the 1960s and early 1970s, which emphasized the success and development of large organizations (Cameron & Whetten, 1983; Goodman & Pennings, 1977). Many large organizations managed to survive during the 30 years of uninterrupted growth that marked the postwar era but were permanent failures that consistently performed poorly (Meyer & Zucker, 1989).

An important issue in research on organizational survival and success is the relevance of gender to the performance of small businesses. The rate of growth in self-employment has recently been greater among women than

The University of North Carolina's Institute for Private Enterprise provided financial support for this study. Indiana University's Center for Survey Research collected the data used. We are grateful to the following people for their constructive comments on earlier versions of this article: Howard Aldrich, Glenn Carroll, Robert Kaufman, Peter Marsden, Toby Parcel, Paul Reynolds, Donald Tomaskovic-Devey, Catherine Zimmer, and this journal's reviewers.

men; women experienced an increase of 35 percent from 1977–82, compared to 12 percent for men (Hisrich & Brush, 1984). Nevertheless, men are still more likely than women to be self-employed. Moreover, researchers and others commonly assert that businesses owned by men are more successful than those owned by women (Aldrich, 1989; Cuba, Decenzo, & Anish, 1983). Indeed, in 1985, the average man-owned business had seven times the average annual receipts of the average woman-owned business (U.S. Small Business Administration, 1986). Data on the relative survival chances of businesses headed by men and by women are sparser than those on success, but descriptions of the disadvantages women face in small business led us to expect them to fail more often than men. In view of the importance of this topic, it is surprising that there is little empirical evidence on how gender differences affect organizational performance. Few studies have directly compared male and female entrepreneurs, and we were unable to locate any studies that examined the determinants of organizational survival and success separately for businesses headed by men and women. We addressed these issues by examining the mechanisms that help to explain business survival and success. Our analysis is based on a group of small businesses in three industries—food and drink, computer sales and software, and health—in South Central Indiana during the period 1985–87.

THEORETICAL ISSUES

Survival and success are distinct aspects of performance that are determined by different processes. Two recent studies have suggested that conclusion.¹ Blau's (1984) investigation of New York architecture firms showed that large firms were more likely to survive but that smaller ones were more profitable. Moreover, Carroll and Huo's (1986) study of newspapers suggested that their survival was more strongly related to institutional environmental variables, such as political turmoil, but that their success was more strongly related to task environmental variables, such as the number of skilled employees in the local labor market.

Explaining Organizational Survival and Success

Much of the recent research on organizational performance has been at the macro level of analysis and has used a population ecology approach (e.g., Hannan & Freeman, 1977). Ecologists generally focus on survival and tend to neglect differences in success among surviving organizations. Population ecologists assume that organizations do not have much control over their survival or failure and that strong inertial forces prevent them from changing their forms to fit their environments better. Selection of particular organization forms by environmental characteristics is thus the fundamental process explaining differences in survival within organizational populations.

¹ Also see a discussion in Meyer and Zucker (1989: 72–74).

Changes in these populations result from turnover among units, not from their transformation or adaptation.

A second line of research on the two dimensions of organizational performance has focused on micro-level determinants. Scholars have assumed that differences in survival and success depend on organizations' abilities to adapt their internal structures to the contingencies associated with their technologies or task environments (e.g., Child, 1972; Pfeffer & Salancik, 1978). Successful organizations are those that best adapt to fit the opportunities provided and constraints imposed by their environments. Such adaptation depends a great deal on the choices and actions an organization's leaders make. Leaders differ in the extent to which they have the psychological traits, experience, and skills needed to accomplish the entrepreneurial and managerial tasks necessary for organizational survival and growth (Cummings, 1988).

Macro and micro perspectives on survival and success are complementary. Organizational ecologists have identified the kinds of structures or environments that are more and less conducive to the survival of certain organizational forms. But ecologists tend to ignore—or at least downplay—the actions of organizational leaders. Studies of entrepreneurs fill this gap and help explain why some organizations are more successful than others, but these microscopic approaches generally ignore the environmental characteristics that affect performance. Our multilevel model of the two dimensions of organizational performance incorporates explanatory variables from both levels of analysis: macro characteristics describing organizations and their environments and micro variables describing entrepreneurs' personal characteristics.

Organizational Age and Performance

The relation between an organization's age and its survival and success illustrates the divergence of the two dimensions of performance. We would expect an organization's age to be generally positively related to its survival. Carroll (1983) concluded that the most common finding of the major empirical studies of mortality is that the death rate of business organizations declines with increasing age; organizations are more likely to die in the first few years of their operation. Young organizations and organizational forms suffer liabilities of newness involving both internal processes, such as coordinating and defining roles and developing trust and loyalty among employees, and external problems like acquiring resources and stabilizing supplier and customer relationships (Stinchcombe, 1965). By contrast, the liabilities of newness are not likely to matter as much once organizations are past a certain age. Therefore, we did not expect an organization's age to be necessarily related to its success (Meyer & Zucker, 1989).

Hypothesis 1: A company's age will be positively related to the probability of its survival but unrelated to its success.

The Effect of Gender Differences on Organizational Performance

Men usually occupy dominant positions in the economy and labor force. Some observers have argued that entrepreneurship is an exception to this general pattern and suggested that self-employment enables women to overcome discrimination and other employment difficulties (Cromie & Hayes, 1988). However, most writers have maintained that self-employed women are still disadvantaged relative to self-employed men because women face barriers associated with education, families, and workplaces (Aldrich, 1989; Goffee & Scase, 1983). The paucity of research on how gender differences affect organizational performance has hindered a resolution of this issue. Almost all our knowledge of entrepreneurship and the success or failure of small businesses comes from studies of men; there is very little hard information on woman entrepreneurs and their businesses, although several authors have called for more information on them (Bowen & Hisrich, 1986; Cromie & Hayes, 1988; Cuba et al., 1976; Hisrich & Brush, 1984; Schwartz, 1976; Wilkens, 1987). The few extant studies of woman entrepreneurs are based on very small or unsystematically selected samples: Goffee and Scase (1983) studied 23 woman proprietors; 86 women who owned businesses in Oklahoma returned Humphreys and McClung's (1981) questionnaires; Pellegrino and Reece (1982) randomly selected 20 woman entrepreneurs; and Schwartz (1976) studied 20 women.

Our second hypothesis examines whether there actually are differences in the two dimensions of organizational performance related to the gender of a business's owner-operator.

Hypothesis 2: Businesses owned and operated by women are less likely to survive and be successful than those headed by men, ceteris paribus.

Our remaining hypotheses are contingent upon Hypothesis 2: if we found that businesses headed by women were indeed less likely to survive, be successful, or both, we would seek to explain why. If women's businesses performed no worse than men's, there would be no female disadvantage to explain and we instead would try to identify the processes that determine the performance of small businesses, regardless of their owners' genders.

Gender differences affecting organizational performance may be produced in two major ways. First, there may be differences between businesses headed by men and women in the level of an independent variable: for example, if small businesses perform less well than large ones and businesses headed by women are generally smaller, then those businesses will perform less well on the average than men's (again, *ceteris paribus*). Such a pattern would show an additive effect of gender. Second, there may be gender differences in the process by which an independent variable is related to the two dimensions of performance: for example, a year of work experience may enhance survival or success more for men than women. In that case, there would be an interaction between gender and the independent variable. We have little basis on which to predict specific interaction

effects a priori because of the scarcity of past research on these issues. Hence, although we tested for the presence of interactions, we state our hypotheses regarding gender differences in terms of additive effects. We frame these hypotheses around variables at the three main levels of analysis included in our model of organizational performance: industry, company, and individual entrepreneurs.

Industrial differences. Self-employed women—like their counterparts who work for someone else—are segregated into certain kinds of work. Businesses owned by women are concentrated in retail sales and in personal and educational service industries, the so-called female ghetto. In 1982, about half of all women entrepreneurs were in service industries, and another 30 percent were in retail trade (U.S. Small Business Administration, 1986). Companies in the service and trade industries generally have lower growth rates and less success (measured by earnings or returns on investment) than businesses in other industries, in part because services and trades are highly labor-intensive and there is a lot of competition among sellers in their product markets (Humphreys & McClung, 1981).

Restricting the industries studied to three groups in which women were prominent prohibited our assessing the impact of industrial gender segregation on business survival and success. However, we could examine within-industry differences in the survival and success of businesses headed by men and women. Within a broad industry group, such as health-related businesses or eating and drinking establishments, there is a second tier of gender segregation. Businesses owned by women tend to be in highly female-typed fields, and those fields may be especially crowded or competitive. Women's concentration in those fields may account for the gender difference in the earnings of small businesses even within industries—in 1980, the average receipts of businesses owned by women in the food and drink industry were 61.4 percent of those owned by men (Loscocco & Robinson, 1989).

Hypothesis 3: Product market characteristics such as the size of an industry and the extent of competition within it help to explain why businesses headed by women are less likely to survive and be successful than those headed by men.

Organization size. Companies headed by women generally employ fewer people than those headed by men (Charboneau, 1981; Humphreys & McClung, 1981). Since women's businesses are generally smaller, they are more exposed to liabilities of smallness than companies headed by men. These liabilities include difficulties in raising capital, meeting government regulations, and competing for labor with larger organizations that pay more and offer greater benefits (cf. Aldrich & Auster, 1986). The smallness of businesses headed by women may help to explain why they perform less well than those headed by men.

Hypothesis 4: Businesses headed by women are smaller than those headed by men, and that explains in part why

the former are less likely to survive and be successful than the latter.

Personal attributes. Differences in the personal attributes of men and women constitute a final set of reasons why businesses headed by women may perform less well than those owned by men. Several studies have suggested that men and women do not differ significantly on many of the psychological attributes thought to characterize successful entrepreneurs; these attributes include work values like independence and motivations such as a need for achievement and a willingness to take risks (Humphreys & McClung, 1981; Pellegrino & Reece, 1982; Schwartz, 1976). Those studies did not compare male and female business owners directly, but we saw little reason to question their conclusions about the absence of gender differences in work values and psychological motivations. We focused instead on two types of personal attributes that we thought were more plausible explanations for any observed gender-based differences in business survival and success.

First, women generally have less business experience than men. The importance of experience for the two dimensions of organizational performance is well documented: for example, a 1974 Dun and Bradstreet study showed that lack of experience and management skills was a contributing factor in 9 of 10 business failures (cf. Humphreys & McClung, 1981; Schwartz, 1976). Moreover, Humphreys and McClung reported that 45 percent of the women they surveyed mentioned lack of previous business experience as a major or moderate obstacle to business success. And Cuba and colleagues (1983) found that women in their study group with more experience than other women had more successful businesses, in terms of sales and profits. Those findings suggest a fifth hypothesis:

Hypothesis 5: Entrepreneurs who are women have less business experience than those who are men, and this discrepancy accounts in part for why companies headed by women are less likely to survive and be successful than those headed by men.

Second, women are generally thought to be less likely than men to engage in innovative behaviors. Innovation is regarded as essential to small business growth and development (Wilkens, 1987), and men are often seen as more apt than women to innovate. For example, none of the 468 women entrepreneurs Hirsch and Brush (1984) surveyed reported that their business was based on a product innovation or modification; rather, the majority founded their businesses using an established or slightly modified product for an existing market.²

Hypothesis 6: Businesses headed by women are less likely to innovate, and this difference explains in part why they

² However, Hirsch and Brush did not have a group of men with whom they could compare their results for women.

are less likely to survive and be successful than those headed by men.

There are a number of possible explanations for why women may tend to avoid innovative products and services. One reason is the social disapproval girls are likely to incur for straying from socially accepted, gender-normative patterns of behavior and the encouragement and tolerance that boys typically receive for engaging in innovative play and nonconforming behavior (e.g., Papalia & Olds, 1981). Unfortunately, our data did not permit us to test this explanation directly. Another possible reason for male-female differences in innovative behavior—one that we can examine with these data—is that women are less confident than men of their ability to succeed in business.

Hypothesis 7: Women have less confidence than men in their business ability and are less apt to feel that they can influence the performance of their business, and these differences explain in part why companies headed by women are less likely to survive and be successful than those headed by men.

RESEARCH DESIGN AND METHODS

Testing these hypotheses required data meeting certain key criteria. The data needed to be longitudinal, since organizational survival and success are dynamic processes. The organizations studied had to be systematically selected from a well-defined population (cf. Kalleberg, Marsden, Aldrich, & Cassell, 1990). Moreover, longitudinal information had to be collected on the characteristics of those organizations, their leaders, and their industries. Our data generally meet these requirements.

A Longitudinal Study of Small Businesses in Indiana

To generate such data, we conducted a longitudinal study of a group of small businesses in Indiana.³ We investigated businesses located in Bloomington, Indianapolis, Evansville, Fort Wayne, Lafayette, Terre Haute, and several other Indiana cities; 12 counties in all are represented. The businesses studied—eating and drinking establishments, computer sales and software companies, and health-related businesses—are fairly typical of businesses found throughout the United States. In the health industry, the largest percentage of the companies studied provided nutrition counseling, physical treatments, health food, and exercise. All of the businesses in the food and drink industry served food, though almost all of them also provided other products and services. Over three-quarters served alcoholic beverages, about 40 percent offered catering, a third provided banquet facilities, and about a quarter provided entertainment. In the computer industry, about three-quarters of the companies sold software and about 65 percent sold or

³ Kalleberg (1986) provides an overview of the study and its main findings.

rented hardware. In addition, almost 80 percent provided systems consultation, 63 percent furnished education services, and nearly half provided word or data processing services.

Sampling procedures. Our primary sampling frame was the telephone book's yellow pages (cf. Freeman & Hannan, 1983). In contrast to businesses emphasizing commercial, business, or producer markets, consumer-oriented businesses like those studied here are likely to be listed in this source, as they are oriented toward local markets and provide services and products to individuals in their communities. Our methods of selecting organizations from the yellow pages differed by industry. Since there were so many businesses listed in the food and drink industry, we randomly selected companies. On the other hand, the yellow pages identified relatively few businesses in the other two industries, so we included all of them as potential respondents. In addition, in the health industry we supplemented the yellow pages with other sources, such as lists provided by networking groups for entrepreneurs who are women.

Data collection. We gathered information in 1985, 1986, and 1987 on characteristics of industries, companies, and owners. In each company, we interviewed the person who both owned the business and had some responsibility for organizing its day-to-day activities. Graduate students and professional staff interviewers of the Center for Survey Research at Indiana University conducted telephone interviews with these people. In general, these owner-operators were very busy, as they were often involved in all aspects of their companies operations, and we had difficulty completing some interviews. Given this pool of respondents, we believe our response rates to be respectable: in 1985, we completed 136 interviews in computer companies, a response rate of 68 percent; 127 in health-related businesses (63.5%); and 148 in eating and drinking establishments (55%).⁴

In wave 2 (1986), we completed 286 interviews in the three industries; 34 companies had gone out of business. The two main reasons for nonresponse were that the owner-operator of a business was persistently unavailable (51%) and that an owner-operator refused to participate (20%). In wave 3 (1987), we sought to reinterview all 377 original owner-operators who did not go out of business in 1986, and we completed 310 interviews. We completed more interviews in wave 3 than in wave 2 (310 vs. 286) for several reasons.⁵ First, we improved our follow-up procedures in the third wave of

⁴ These response rates were computed as the number of completed interviews divided by the number of people who were interviewed, who refused, who were out of town throughout the study, and who were persistently unavailable after repeated tries. The response rates exclude people with nonworking telephone numbers, businesses with no eligible owners, and people who were ineligible for other reasons.

⁵ In wave 2, we completed 103 interviews in the computer industry (a 76 percent response rate), 98 in food and drink (67%), and 85 in health-related businesses (66%). In wave 3, we completed interviews with 106 people in the computer industry, 112 in food and drink, and 92 in health.

TABLE 1
Summary of Businesses Studied

Industry	Businesses Headed by Men			Businesses Headed by Women		
	N	Number of Failures	Percentage of Failures	N	Number of Failures	Percentage of Failures
Food and drink	106	15	14	42	7	17
Computers	122	23	19	14	1	7
Health	84	12	14	43	7	16
Totals	312	50	16	99	15	15
χ^2		1.19			0.82	
df		2			2	

interviews. Second, we conducted an abbreviated interview in wave 3 with another key informant if the original one was unavailable, while in wave 2 we only interviewed the same people we had interviewed initially.⁶ By 1987, an additional 31 companies had gone out of business, for a total of 65 during our study period. The death rate of 8 percent per year among the companies studied is similar to that Reynolds found in his study of new firms in Minnesota (eg., Reynolds & Miller, 1989).

Table 1 summarizes the numbers of firms we studied headed by men and by women in each of the three industries. Not surprisingly, businesses headed by men outnumbered those headed by women in each industry. Nevertheless, nearly a quarter of the businesses had women heading them, with the highest proportion in the health industry and the lowest in the computer industry. Table 1 also lists the number of companies that went out of business in each industry-gender group. We examine these patterns of survival and failure in more detail below.

Measures of Organizational Survival and Success

Organizational survival is a fundamental aspect of performance and a necessary condition for sustained business success. Organizational death takes many forms, including dissolution, merger, and reorganization. Unfortunately, our data do not allow us to distinguish among the different processes that ideally should be analyzed separately in a study of dissolutions (Freeman, Carroll, & Hannan, 1983): complete dissolution, bankruptcy, relocation, sale to a larger company, and so on. In this study, we defined a company as out of business at the time of the second or third wave of interviews (1986 or 1987) if the telephone number used in the previous wave (1985 or 1986) was no longer operative and we were unable to find a new, valid number for the business. This is a reasonable assumption for small businesses, especially in these industries: small companies generally do not

⁶ Of the 310 interviews in wave 3, 282 were with the same person previously interviewed in a company and 28 were with another knowledgeable person in the company.

move far geographically (Birch, 1987) and, when they do move, tend to keep the same telephone number to maintain contacts with customers.

Surviving companies differ in the degree to which they are successful. Success can be measured in a variety of ways: by accounting-based indicators of financial performance, such as returns on investment; by market-based indicators of financial performance, like market share; and by stakeholders' evaluations of performance, such as the degree of satisfaction they express.⁷ Our measure of success was based on a company's gross earnings, the only quantitative indicator of success available in the data set. We experimented with various additional possibilities, most notably a rough measure of profits based on respondents' perceptions of whether their business profits had increased, decreased, or remained the same during the previous two years. This variable was unrelated to the probability of survival when we added it to the model reported in Table 4.

Growth in the logarithm of gross earnings during the study period was our measure of success. In each wave of interviews, owner-operators reported their company's gross business earnings for the prior year. In our analysis, we regressed gross earnings in later periods (1986 and 1987) on initial (1985) gross earnings. Controlling for level of earnings at the beginning of the study period avoided confounding a company's initial resources with its earnings at the end of the period.

Measures of Independent Variables

Table 2 presents means and standard deviations for all the independent variables used in our analysis. Table 3 presents correlations among the variables.

Industries. Our first two industrial measures are indicators of the sizes of the business populations in the same industries and geographical areas as the respondents'; we obtained data for these measures from *County Business Patterns* (U.S. Department of Commerce, 1983–1986). The first measure is the number of businesses with employees in a respondent's industry and county lagged one year; thus, wave 1 data represent 1984 values, wave 2 data, 1985 values, and wave 3 data, 1986 values. These counts include firms of all sizes, both incorporated and unincorporated, in each industry and each of the 12 counties represented in the data set. The percentage of change in industry size represents change in the number of businesses in Indiana in a respondent's industry, also lagged one year. These measures tap different things, so the correlations between them are low: $-.06$ for men's businesses and $.05$ for women's (see Table 3).

Our other industry-based measure is a perceptual one; we asked for entrepreneurs' perceptions of the extent of competition in the product market in which their businesses operated and how much of a problem compe-

⁷ For discussions of these dimensions of performance, see Venkatraman and Ramanujam (1986).

TABLE 2
Means and Standard Deviations for All Variables

Variables	Businesses Headed by Men		Businesses Headed by Women	
	Means	s.d.	Means	s.d.
Industry				
Food and drink	0.35	0.48	0.41	0.49
Health	0.26	0.44	0.44	0.50 ^d
Competition ^a	1.79	0.52	1.75	0.55
Size ^a	585.41	596.80	763.70	587.95 ^d
Percent change in size ^a	0.07	0.65	0.02	0.09
Company				
Incorporation ^a	0.73	0.44	0.64	0.46 ^d
Gross earnings ^{a,b}	10.72	0.80	10.51	0.85 ^d
Size ^{a,b}	1.78	1.12	1.20	0.97 ^d
Age ^a	13.19	15.17	10.55	11.59 ^d
Number of products and services	0.43	0.22	0.38	0.21 ^d
Edge is quality	0.23	0.42	0.30	0.46 ^c
Innovations ^a	0.46	0.27	0.43	0.26
Owner-operator				
Age ^a	44.49	11.35	44.96	10.65
Years in industry ^a	15.22	11.07	12.17	9.43 ^d
Prior self-employment	0.23	0.42	0.22	0.39
Involvement in other business ^a	0.38	0.48	0.18	0.37 ^d
Confidence	4.09	1.09	4.09	1.02
Internal locus of control	4.70	0.98	4.64	1.06
N	878		261	

^a This is a time-varying explanatory variable, that is, a variable whose values differ for each time period.

^b This variable was measured as a logarithm.

^c The difference between men and women is significant at $p < .05$, two-tailed test.

^d The difference between men and women is significant at $p < .01$, two-tailed test.

tion was for them. We averaged responses to four questions: "How much competition would you say there is in your market?", for which responses ranged from 1 = none to 4 = a great deal; "My business has been affected by increased competition from large businesses" and "My business has been affected by increased competition from small businesses" (1 = yes, 0 = no); and "How much of a problem for you is competition?" 1 = no problem at all to 5 = a great problem). The competition scale has a reliability (Cronbach's alpha) of .57. Less than 3 percent of the variation in this measure lies between industries, with the rest due to differences among companies within these industry categories.

Companies. We measured a company's age in years since its founding. In 1985, the average age of the companies headed by men (13.2) was greater than that of those headed by women (10.5). These rather high average ages suggest that the companies studied were all relatively successful ones. Cuba and colleagues (1983) measured the success of a business by whether it had survived for 5 years, a feat they termed "remarkable" in the U.S. economy.

TABLE 3
Correlation Matrix^a

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1. Out of business		.01	.03	.01	.09	.06	.01	.01	.03	-.07	-.05	-.09	.06	-.02	.04	-.08	.02	-.02	-.10
2. Gross earnings ^b	-.10		.19	-.27	.08	-.23	-.01	.36	.34	.08	.13	-.04	.11	-.04	.02	.07	-.15	-.01	-.01
3. Food and drink	-.02	-.01		-.75	.13	.10	-.05	.24	.32	.35	.27	.23	.06	.43	.27	-.04	-.13	-.01	-.04
4. Health	-.01	.07	-.43		-.17	.25	-.01	-.37	-.48	-.25	-.49	-.04	-.08	-.24	-.17	-.04	.08	-.16	-.03
5. Competition	.03	.02	-.04	.15		.04	.01	.13	.24	.10	.19	.16	.10	-.03	.12	.06	.12	-.03	-.01
6. Industry size	-.03	.04	.34	.40	-.07		.05	-.19	-.21	-.09	-.20	.16	.13	.04	-.12	-.21	-.04	-.19	-.04
7. Percent change in industry size																			
8. Incorporation	-.03	-.02	-.06	-.05	.04	-.06		.00	.02	-.07	.03	-.02	-.01	-.05	-.05	-.03	-.01	.04	.04
9. Size ^b	-.08	.08	.09	-.39	.18	-.05	.04		.48	-.04	.35	.00	.18	-.06	-.11	.03	.05	.07	-.01
10. Company age	-.06	.19	.10	-.34	.20	-.06	.05	.43		.23	.43	.06	.26	.02	.19	.10	.13	.14	-.07
11. Number of products or services	-.08	.08	.04	.12	.04	.11	-.05	.06	.11		-.18	.14	-.03	.44	.65	.05	-.11	.00	-.16
12. Edge is quality	.02	-.03	-.04	-.27	-.03	-.25	.02	.12	.20	-.18		-.13	.17	-.02	-.08	.03	.06	.08	.08
13. Innovations	-.06	.06	.20	-.05	-.02	.07	.01	.07	.10	-.01	.03		.03	.17	.08	-.25	-.10	-.02	.03
14. Owner's age	.03	.03	-.05	-.03	.13	.02	.02	.13	.26	-.11	.17	.05		-.15	.01	-.03	.10	.03	.06
15. Years in industry	-.01	-.05	.14	-.01	-.05	.02	-.06	-.04	.01	.39	-.12	.08	-.15		.38	-.03	-.18	.17	-.01
16. Prior self-employment	-.07	.10	.04	-.04	.00	-.07	-.03	.13	.17	.46	-.03	.04	-.04	.59		-.01	-.05	.05	-.07
17. Involvement in other business	.06	-.01	.09	-.11	.04	.03	.07	.10	.14	-.09	.07	.10	.00	.06	-.10		-.07	.22	-.02
18. Confidence	.07	.04	-.01	-.05	.10	.08	.00	.13	.15	-.06	.10	-.02	.08	-.07	-.12	.23		.02	-.03
19. Internal locus of control	-.10	.07	.00	.08	-.11	.09	.03	-.04	.07	.06	-.06	-.03	.14	.04	.08	.02	.04		.23
	-.01	.09	.09	-.05	.00	.03	.02	.04	.03	-.03	.06	.00	.01	-.01	.01	-.03	.08	.06	

^a Correlations for men's businesses are below the diagonal and those for women's businesses are above. Correlations greater than .12 for women and .07 for men are significant at $p < .05$, two-tailed test.

^b This variable was measured as a logarithm.

Our measure of an organization's size was the logarithm of the number of its full-time employees.

Our measure of innovation was based on respondents' reports of which of the following six types of innovations they had engaged in during the two prior years: new products, new services, new advertising techniques, new management or organizational structures, physical changes, and other innovations. We averaged the types of innovations reported in each wave of the survey.

Finally, several variables were included in our analysis as controls. First, we recorded whether or not companies were incorporated (0 = no, 1 = yes). Incorporation is an indicator of the extent to which a business is institutionalized and has certain legal and financial protections that may inhibit dissolution. Second, we measured generalism and specialism by summing the number of products or services a company provided and dividing by the number of possible products or services that were represented by the businesses studied. Third, respondents were asked an open-ended question about whether there was anything about their business that they felt gave them an edge over their competitors. From responses to this question, members of the research team coded whether or not a company's edge was a high-quality product or service. The resulting measure allowed us to assess the importance to the owner-operators studied of quality, a characteristic many observers have seen as crucial for business excellence (Peters & Waterman, 1982).

Entrepreneurs. Table 2 indicates that the average age in 1985 of both the men and women interviewed was between 44 and 45. We used two measures of experience: the number of years a respondent had been in an industry and whether or not he or she had been self-employed before acquiring the current business (1 = yes, 0 = no).

Two measures of personal attributes were used: respondents' assessments of how successful they were in business and an indicator of internal locus of control (Brockhaus, 1982). For the first of these measures, our measure of confidence, we summed responses to two statements: "I have a better idea about running my business than most of my competitors" and "Compared to others, I feel I am very successful in my present business" (5 = agree, 3 = undecided, 1 = disagree). To assess locus of control, we used responses to the statement, "I feel that outcomes of my business ventures are largely influenced by my own efforts," made on the same scale.

Our models also included a measure of whether respondents were involved in other businesses (1 = yes, 0 = no), a rough control for competing demands on the entrepreneurs' time. We expected that people who spread themselves over many businesses might be unable to devote sufficient attention to the company of interest.

Analytic Strategy

All longitudinal studies of organizational mortality will contain censored data, that is, data on organizations that do not die during the period of

observation. Our data set illustrates variable-age censoring, in which censoring has no relationship to the age of a company. This contrasts with fixed-age censoring, in which all organizations censored at the end of an observation period are the same age, and with cohort-varying fixed-time censoring, in which several birth cohorts are followed until a fixed point in calendar time (Carroll, 1983).

Both left and right censoring characterize our design. The left censoring occurred because organizations that were founded at the same time as those studied but failed before 1985 were not included. We also did not add companies in the second and third waves of data collection. Thus, successful, viable businesses are necessarily overrepresented because the data are from a cross-section followed over time. Although we could not adjust statistically for the bias introduced by left censoring, we were sensitive to this source of sample bias and consider some of its implications for our findings in the concluding section. The right censoring occurred because we did not observe businesses for their whole lives; those surviving in 1987 may die eventually, but we did not control for the times of their deaths. To control for right censoring, we used a discrete event history analysis (Allison, 1984). The dependent variable for our analysis of survival was the discrete-time hazard rate, or the probability that a firm would go out of business in either 1986 or 1987. Ordinary-least-squares regression was inappropriate for estimating such a probability, which varies between 0 and 1, so we used the logarithmic odds of going out of business (the "logit" transformation) and estimated the effects of our explanatory variables on the hazard rate by logistic regression analysis. Our estimation model is $\log [P(t)/1 - P(t)] = a(t) + \sum b_i x_i + \sum c_j x_j(t)$, where $a(t)$ is a constant that compares events occurring in 1986 as opposed to 1987, b_i is a set of coefficients of the independent variables (x_i) that do not vary over time (i denotes a particular such independent variable), and c_j is a vector of coefficients of the independent variables [$x_j(t)$] that do change over time (j represents each such time-varying explanatory variable). The values of the time-varying explanatory variables differ for the different time periods. The time-varying explanatory variables are identified in Table 2 (Allison, 1984; Aldrich, Zimmer, & McEvoy, 1989: 928).

Event history analysis controls for right-censored cases by a unique data structure. We created one data record for each year a firm was in business. Each record contains a dichotomous variable coded 0 if a firm was in business and 1 if it had dissolved by the end of the year. Our units of analysis are thus business-years. Our 411 organizations yielded 1,139 business years. Censored observations—those from organizations that were in business throughout the period—contributed a maximum of three business-years to the data set; businesses failing in 1987 contributed two; and those dying in 1986 contributed one. This data structure solved the problem of bias due to right censoring since all information collected on surviving businesses was used. The data structure also allowed us to take into account changes in some of the explanatory variables that occurred during the three-year period.

RESULTS

Determinants of Survival

Table 1 provides initial evidence on our second hypothesis. Contrary to the first part of Hypothesis 2, women were not more likely than men to go out of business: 16 percent of businesses headed by men failed, compared to 15 percent of those headed by women ($\chi^2 = .002$, 1 *df*, *n.s.*). Business failure also did not differ significantly by industry, as the nonsignificant chi-square values at the bottom of Table 1 indicate.

The issue of gender differences is examined further in Table 4, which presents the results of our analysis of the determinants of the probability of whether or not a company went out of business in either 1986 or 1987.⁶ The nonsignificant coefficient for gender in the last column of Table 4 reinforces our conclusion that businesses headed by men and women were equally likely to go out of business during the study period.

In Table 4, we report results separately for businesses headed by men and women and for both together. Overall tests of significance (likelihood ratio *F*-tests) showed that gender-specific coefficients did not improve the explanatory power of the model; indeed, only one variable, prior self-employment, had different effects for men and women. The absence of significant interaction suggests that the processes underlying the survival of businesses headed by men and women are similar. It is not surprising that we found little interaction by gender, given the event-history structure of our data: for men, only 50 of 878 business-years resulted in a company going out of business; for women, only 15 of 261 years involved failure. The statistical power to detect gender interactions available to us was thus very low.

For men, the coefficient of the period variable was significant, indicating that businesses headed by men were more likely to go out of business in 1986 than in 1987. Including this period constant in our model controlled for unmeasured variables that differ across time periods, such as unemployment rates.

Industries. As the results shown in Table 1 indicate, there were no overall differences among industries in the probability of business survival. Nor did the effects of the explanatory variables vary much among industries. Consistent with our earlier expectations, the results shown in Table 2 indicate that the businesses headed by women we studied were in larger popu-

⁶ In preliminary analyses, we considered and rejected other variables not presented here. These included measures of owner-operators' personal characteristics such as their commitment to work, the importance they placed on various aspects of work, sole ownership of the business of interest, and educational attainment. We also experimented with indicators of types of business problems. Adding these potential independent variables did not enhance our models, and their inclusion did not seem essential on theoretical grounds. Cases with missing data on any of independent variables that appear in Table 4 were assigned the mean of that variable for the valid cases.

TABLE 4
Industrial, Organizational, and Individual Determinants of Log Odds of
Going Out of Business

Independent Variables	Men's Businesses		Women's Businesses		Totals	
	<i>b</i>	Standard Error	<i>b</i>	Standard Error	<i>b</i>	Standard Error
Industry						
Food and drink	-0.13	0.26	0.58	0.70	-0.03	0.22
Health	-0.15	0.30	0.27	0.72	-0.14	0.25
Competition	0.10	0.15	0.55	0.32*	0.20	0.13
Size	0.00	0.00	0.00	0.00	0.00	0.00
Percent change in size	-1.09	0.47*	1.70	3.29	-0.93	0.45*
Company						
Incorporation	-0.39	0.20*	-0.04	0.41	-0.29	0.17*
Gross earnings ^a	-0.14	0.08*	-0.04	0.21	-0.10	0.07
Size ^a	-0.05	0.09	0.16	0.20	-0.03	0.08
Age	-0.02	0.01*	-0.05	0.03*	-0.03	0.01**
Number of products or services	-0.12	0.41	-2.21	1.28*	-0.26	0.36
Edge is quality	-0.38	0.24	-0.92	0.44*	-0.46	0.20*
Innovations	0.63	0.31*	0.68	0.77	0.61	0.27*
Owner-operator						
Woman					0.04	0.17
Age	0.01	0.01	0.01	0.02	0.01	0.01
Years in industry	0.00	0.01	0.02	0.02	0.00	0.01
Prior self-employment	0.32	0.18*	-0.56	0.50	0.17	0.16 ^b
Involvement in other business	0.32	0.17*	-0.07	0.43	0.26	0.15*
Confidence	-0.19	0.07**	-0.01	0.16	-0.16	0.06**
Internal locus of control	0.01	0.08	-0.13	0.11	-0.04	0.06
Period—1986 or 1987	0.51	0.16**	0.21	0.31	0.42	0.13**
Intercept	5.31		3.30		4.87	
<i>N</i>	878		261		1,139	
χ^2	946		231		1,133	
<i>df</i>	858		241		1,118	

^a This variable was measured as a logarithm.

^b The difference between men and women is significant at $p < .10$.

* $p < .05$, one-tailed test

** $p < .01$, one-tailed test

lations than the businesses headed by men, though the rate of change in industry size was similar for all the businesses studied. Companies headed by men in rapidly growing industries were less likely to have gone out of business, an effect that was not observed for companies headed by women. We speculate that a positive rate of growth in an industry reflects enhanced opportunities and expanding markets, conditions likely to promote survival. Alternatively, decrease in industry size could signal that business conditions in general were not good.

Table 2 indicates that the level of competition was similar for businesses

headed by men and women. However, within industries, women in highly competitive markets were more likely to have gone out of business. This finding provides some support for Hypothesis 3, though the coefficient of competition for women was not significantly different from that for men.

Companies. Older companies were less likely to go out of business, supporting Hypothesis 1. Also consistent with our reasoning that survival and success are distinct aspects of performance is the finding that gross earnings were unrelated to survival for women's businesses. Earnings enhanced survival for businesses headed by men, though the effect was not a particularly strong one.

Companies headed by women were smaller than those headed by men: the mean for the latter is 12 employees, compared to 6 for the former, a finding supporting the first part of Hypothesis 4 (cf. Charboneau, 1981; Humphreys & McClung, 1981). However, we found no evidence that smallness was a liability for either men's or women's businesses. The absence of a size effect on survival is not unreasonable considering that the model controls for variables highly correlated with size, such as incorporation status. To assess the possibility that the correlations of size were confounding the effects of size, we reestimated the pooled model excluding all company-level variables except size (analyses not shown). The effect of size was negative and significant at $p < .10$.

Companies headed by men offered a wider range of products and services than those headed by women. Generalists were less likely to have gone out of business than specialists, but only among women's businesses. Generalism may reflect an organizational adaptation to high environmental uncertainty (Wholey & Brittain, 1986: 522–524). This adaptation could be described as a thrashing process in which companies try a variety of different products or services in order to stay in business.

Businesses headed by men were more likely to be incorporated than those headed by women (Table 2). Incorporated businesses headed by men were less likely to go out of business; the coefficient of incorporation was also negative, though nonsignificant, for women's businesses.

Moreover, women were somewhat more likely to feel that quality gave them an edge over their competitors (Table 2). Women who reported that the quality of their products and services gave them an edge were less likely to have gone out of business during this period; the coefficient for men is in the same direction but is not statistically significant. This finding also confirms the idea that quality is of key importance as expressed in many popular books on management (e.g., Peters & Waterman, 1982).

Finally, contrary to the expectations expressed in the first part of Hypothesis 6, men were not more likely to report business innovations than women (Table 2). This finding suggests that previous discussions of a male-female innovation gap have been misguided. A possible methodological reason for our finding is the broadness of our innovation measure, which was not restricted to major or dramatic changes. In any event, Table 4 suggests that the businesses headed by men that frequently engaged in innovative

behaviors were less likely to survive than other businesses headed by men; innovation was unrelated to survival among women's businesses. We speculate that organizations scoring high on our broad measure of innovation may be marginal ones that are seeking to find a formula for success by trying new things, a phenomenon similar to the thrashing about noted above. This result also confirms the idea that staying close to familiar products is better than introducing a wide variety of products and services.

Personal attributes. The first part of Hypothesis 5, which says that men have more business experience than women, received mixed support: men reported that they had spent more time in their current industries, but similar proportions (22 and 23%) of men and women had been self-employed prior to owning their current businesses (see Table 2). Nevertheless, businesses run by entrepreneurs with greater experience in an industry were not more likely to survive, a finding contrary to the expectations expressed in Hypothesis 5, as is the finding that prior self-employment is positively related to going out of business for men. The latter result is, however, consistent with a common theme in the entrepreneurship literature: entrepreneurs typically fail, often many times, before achieving success. Further support for this is provided by the finding (not shown) that the men studied had been self-employed more times on the average than the women; among people who were previously self-employed, men were self-employed an average of 1.98 times, compared to 1.24 times for women, a statistically significant difference. It may be, then, that men are more likely than women to take the risks associated with repeated attempts to start new businesses.

Contrary to the first part of Hypothesis 7, the results in Table 2 indicate that male and female entrepreneurs appear to be equally confident and to have similar opinions about their ability to influence business outcomes through their own efforts. The men who were more confident in their business abilities in 1985 were less likely to go out of business. That relationship offers some support for the second part of Hypothesis 7, though the difference between men and women is not significant. We speculate that the confidence effect might reflect the impact of entrepreneurs' personal efforts on their success. A plausible alternative explanation is that we tapped respondents' awareness that their businesses were either successful or in trouble in 1985, perceptions that may have been validated in the next several years, and that men perceived their survival chances more accurately.

Finally, men were much more likely than women to be involved in businesses other than the one studied. Table 4 indicates that businesses headed by men who were involved in other companies were more likely to fail, but outside involvement was unrelated to business survival of women. One possible interpretation for that difference is that involvement in other businesses is a proxy for an entrepreneur's degree of dependence on a company. By this argument, men are less dependent on their businesses (see Table 2) and thus less likely to be willing to absorb extra hours to keep them going.

Summary. Companies headed by women were no more likely to go out of business than those headed by men, contrary to Hypothesis 2. Moreover, the processes generating survival did not differ by gender: only one variable—previous self-employment—had significantly different effects on survival for businesses headed by men and women. A company's age was positively related to its survival regardless of the gender of its owner-operator (cf. Hypothesis 1). Size was unrelated to survival for both men's and women's businesses, contrary to Hypothesis 4.

The remaining effects were observed for only one gender: competition increased the death rate among businesses headed by women, and rapid changes in industrial populations increased the survival chances of businesses headed by men (Hypothesis 3); incorporation and high gross earnings enhanced survival only among businesses owned by men; generalism and an emphasis on quality decreased the probability of failure only among women's businesses; innovations were positively related to failure only among men's businesses, contrary to Hypothesis 6; confidence enhanced survival only for men, partially supporting Hypothesis 7; a prior history of self-employment increased the probability of going out of business only among men, contrary to Hypothesis 5; and being involved in other businesses decreased chances of survival only for men.

Determinants of Success

Businesses headed by men had a higher level of gross earnings than those headed by women: mean earnings for the former were nearly \$54,000, compared to about \$46,000 for the latter. However, that discrepancy does not necessarily mean that men's businesses were more successful than women's in terms of our indicator of success, growth in earnings from one year to the next. We examined change in earnings by regressing gross business earnings in later periods on initial earnings and a set of independent variables. The coefficient of initial earnings represents the stability in earnings during the period. The coefficients of the other explanatory variables in the model denote the impacts of the independent variables on changes in earnings. Table 5 presents these results.

As with survival, there was no gender difference in success, contrary to Hypothesis 2. Moreover, the models do not differ significantly for men and women; results of a global F -test for gender interactions ($F = .989$, with 19 and 1,099 df) were not significant at $p < .05$, and only one variable—involvement in another business—had a significant interaction with gender. Hence, we report coefficients for a pooled model as well as coefficients from models estimated separately for men and women.

Industries. Businesses headed by men in the health industry had higher earnings growth than those in computers, but there were no other differences among industries. There was also very little interaction by industry, so we again present results from models pooled across the three industries. Con-

TABLE 5
Industrial, Organizational, and Individual Determinants of Growth in
Business Earnings

Independent Variables	Men's Businesses		Women's Businesses		Totals	
	<i>b</i>	Standard Error	<i>b</i>	Standard Error	<i>b</i>	Standard Error
Gross earnings, 1985	0.58	0.03**	0.65	0.05**	0.61	0.02**
Industry						
Food and drink	0.12	0.07	0.15	0.15	0.16	0.06**
Health	0.20	0.08*	0.12	0.15	0.20	0.07**
Competition	-0.05	0.04	0.02	0.07	-0.04	0.04
Size ^a	-0.00	0.05	-0.11	0.08	-0.03	0.04
Percent change in industry size	-0.03	0.03	-0.06	0.42	-0.03	0.03
Company						
Incorporation	0.09	0.06	0.12	0.10	0.11	0.05*
Size ^b	0.07	0.02**	0.14	0.05**	0.08	0.02**
Age	0.00	0.00	-0.01	0.01	0.00	0.00
Number of products or services	0.13	0.10	-0.26	0.24	0.11	0.09
Edge is quality	0.03	0.05	-0.02	0.09	0.01	0.04
Innovations	-0.02	0.08	-0.07	0.15	-0.02	0.07
Owner-operator						
Woman					-0.05	0.05
Age	-0.01	0.00**	-0.01	0.00	-0.01	0.00**
Years in industry	0.00	0.00	0.00	0.01	0.00	0.00
Prior self-employment	-0.04	0.05	0.01	0.10	-0.02	0.05
Involvement in other business	0.04	0.05	-0.22	0.11*	-0.01	0.04 ^c
Confidence	0.01	0.02	-0.04	0.04	0.01	0.02
Internal locus of control	0.03	0.02	-0.02	0.04	0.02	0.02
Period—1986 or 1987	-0.03	0.04	-0.04	0.08	-0.03	0.04
Intercept	0.33		0.61		0.28	
N	878		261		1,139	
Adjusted R ²	.42		.53		.45	

^a This statistic represents size multiplied by 1,000.

^b This variable was measured as a logarithm.

^c The difference between men and women is significant at $p < .10$.

* $p < .05$, one-tailed test

** $p < .01$, one-tailed test

trary to Hypothesis 3, none of our industry variables (industry size, change in industry size, and competition) were related to changes in earnings for either men or women.

Companies. Consistent with the second part of Hypothesis 1, a company's age was unrelated to its earnings growth for both men's and women's businesses, providing further support for the view that survival and success are distinct aspects of performance.

A company's size was positively related to its earnings growth for both men's and women's businesses. Since businesses headed by women are generally smaller (Table 2), size helps contribute to male-female differences in earnings growth (cf. Hypothesis 4). The absence of a gender gap in success suggests that other mechanisms help to offset women's business-size disadvantage.

Contrary to Hypothesis 6, innovations were unrelated to earnings growth for both men's and women's businesses. In addition, neither the generalist-specialist distinction nor an emphasis on quality enhanced growth in business earnings for either group.

Personal attributes. Experience was unrelated to short-term business success for men and women. This finding fails to support the second part of Hypothesis 5: men's businesses were not more successful because men have more experience. Whether an entrepreneur had been previously self-employed was also unrelated to growth in business earnings.

These results also fail to support the second part of Hypothesis 7: both our confidence scale and our indicator of locus of control were unrelated to earnings growth. These data thus provide no support for the view that men are better able than women to translate confidence in their business abilities into business success.

Older male entrepreneurs were less successful than younger ones; we observed that discrepancy also for women, though for the latter the age coefficient is not statistically significant. Since our model controls for experience, this negative age effect may reflect a lessening of older entrepreneurs' ability to keep up with the pressures of small business ownership. Finally, women who were involved in other businesses were less successful, though involvement in other businesses had no impact on earnings growth for men.

Summary. There were no differences in earnings growth between businesses headed by men and women, contrary to Hypothesis 2. Moreover, the processes underlying growth in earnings appear to be similar, since only one variable, involvement in another business, had a significantly different effect on success for men and women.

Old organizations were not more successful than young ones, regardless of the owner-operator's gender, confirming the last part of Hypothesis 1. Large organizations, whether headed by men or women, were more successful than small ones in the sense of having growth in earnings (cf. Hypothesis 4).

Several other variables had significant effects for only one gender: men's businesses in the health industry had higher earnings growth than those in computers, but otherwise none of the industry variables had an impact on earnings growth, contrary to Hypothesis 3; an entrepreneur's age was negatively related to growth in earnings among men; and only companies headed by women who were involved in other businesses experienced less earnings growth than other businesses studied. Earnings growth was unrelated to experience, innovation, and confidence for both men and women, contrary to Hypotheses 5, 6, and 7.

CONCLUSIONS AND IMPLICATIONS

That women entrepreneurs are disadvantaged relative to their counterparts who are men is a common theme in discussions of entrepreneurship and organizational performance. Authors frequently point to the barriers women face in small business raised by socialization practices, educational experiences, family roles, lack of networks of business contacts, and so on. Disadvantages experienced by women in all these areas are widely believed to result in higher failure rates and lower growth rates for women's businesses. As with many accepted "facts" in the entrepreneurship literature, however, these claims and assumptions have rarely been subjected to empirical testing; very few carefully constructed studies have directly compared the performance of businesses headed by men and women.

This study helps to fill this gap in our knowledge about the effects of gender on organizational performance. We examined the determinants of survival and success among small businesses headed by men and by women using longitudinal data. Our findings sharply challenge the conventional wisdom regarding women's inferiority in entrepreneurship: the women's businesses we studied were no more likely to fail—and were just as successful—as the men's. Moreover, we found that the determinants of survival and success operated in much the same way for men and women, suggesting that the processes underlying small business performance are similar irrespective of an entrepreneur's gender.

The scarcity of previous sound research on gender differences in organizational performance and entrepreneurship cautions us against drawing premature conclusions based on these results. Our data have several obvious and important limitations. Our study group was restricted to three industries, which made it impossible for us to assess whether businesses headed by women are less likely to survive because they are often in service industries with high failure rates. Perhaps a more serious problem is our oversampling of successful businesses. Left censoring introduces bias into our results, and that bias may vary systematically by gender. For example, it could be that businesses headed by women are more likely to fail in general, but those that survive may be unusually successful and thus similar to businesses headed by men.

Our measures of survival and success were also far from ideal. We would have preferred to have had more objective information on profits, market share, and other indicators of business success, though there is evidence that subjective assessments of success made by key informants converge considerably with objective measures (Venkatraman & Ramanujam, 1986). We also would have liked to have known more precisely the circumstances under which the vanished companies went out of business—whether they were bought by a larger company, went bankrupt, moved to another state, and so on. It would also have been desirable to have had more precise and objective information on our industrial and organizational independent variables.

Our inability to explain more of the variation in business survival and success may have another cause. To a large and unknown degree, essentially random processes that defy measurement and study may determine these dimensions of performance (Kaufman, 1985). It may also be the case that our study did not cover a sufficiently long time period; the years 1985, 1986, and 1987 did not vary dramatically in business cycles and conditions. We intend to survey the respondents to this study in the future, hoping that a long time lapse may reveal greater impacts of our industrial, organizational, and individual variables on their organizations' survival and success than emerged here.

Our suggestive findings will, we hope, encourage others to pursue these issues using richer data sets. Further research is necessary to test more rigorously some key implications of our results for theories of gender, entrepreneurship, and organizational performance. Thus, it may be that an owner's gender has little relevance to the survival and success of small businesses because competitive market mechanisms govern those processes. That view is consistent with an ecological, demand-side perspective that explains entrepreneurial survival and success on the basis of the structure of opportunity in an industry. If opportunity structures pull people into starting businesses in particular niches, an entrepreneur's gender shouldn't matter much in determining the survival and success of the business. By contrast, if characteristics related to the supply of entrepreneurs primarily govern the performance of small businesses, women may more often be pushed into lower-quality opportunities—by family constraints, lack of business contacts, or poor occupational options—and hence may be prone to poorer business performance than men. Future research needs to examine which of those scenarios better describes entrepreneurship among women.

Our results also suggest that the processes underlying small business performance are generally similar for men and women. Despite the widely shared assumption that women are less apt than men to innovate, for example, we found no evidence of women's being less likely to do this in their businesses. Moreover, we found no evidence that men were more confident of their business abilities.

On the other hand, we did find hints that different market approaches may pay off differentially for women and men. In particular, a generalist orientation and an emphasis on quality appear to be more salient to the survival chances of businesses headed by women, though the differences between men and women on those dimensions were not statistically significant. Our finding that women's businesses in competitive markets are more likely than men's to fail suggests a possible reason for the importance of those characteristics; the edge provided by high quality and the flexibility made possible by generalism may be particularly important in helping women to compete in the small business arena.

Future comparative research needs to address systematically these speculations. Such research should be based on samples of businesses carefully selected from well-defined populations and followed over time. Such stud-

ies need to recognize that survival and success are divergent aspects of performance determined by processes at several levels of analysis, including the industrial context of an organization, the organization itself, and the individual entrepreneur.

REFERENCES

- Aldrich, H. E. 1989. Networking among women entrepreneurs. In O. Hagan, C. Rivchun, & D. Sexton (Eds.), *Women-owned businesses*: 103–132. New York: Praeger.
- Aldrich, H. E., & Auster, E. 1986. Even dwarfs started small: Liabilities of age and size and their strategic implications. In B. M. Staw & L. L. Cummings (Eds.), *Research in organizational behavior*, vol. 8: 165–198. Greenwich, CT: JAI Press.
- Aldrich, H. E., Zimmer, C., & McEvoy, D. 1989. Continuities in the study of ecological succession: Asian businesses in three English cities. *Social Forces*, 67: 920–944.
- Allison, P. D. 1984. *Event history analysis: Regression for longitudinal event data*. Beverly Hills, CA: Sage Publications.
- Birch, D. L. 1987. *Job creation in America: How our smallest companies put the most people to work*. New York: Free Press.
- Blau, J. 1984. *Architects and firms*. Cambridge, MA: MIT Press.
- Bowen, D. D., & Hisrich, R. D. 1986. The female entrepreneur: A career development perspective. *Academy of Management Review*, 11: 393–407.
- Brockhaus, R. H. 1982. The psychology of the entrepreneur. In C. A. Kent, D. L. Sexton, & K. H. Vesper (Eds.), *Encyclopedia of entrepreneurship*: 39–57. Englewood Cliffs, NJ: Prentice-Hall.
- Cameron, K. S., Sutton, R. I., & Whetten, D. A. (Eds.). 1988. *Readings in organizational decline: Frameworks, research, and prescriptions*. Cambridge, MA: Ballinger.
- Cameron, K. S., & Whetten, D. A. 1983. *Organizational effectiveness: A comparison of multiple models*. New York: Academic Press.
- Carroll, G. R. 1983. A stochastic model of organizational mortality: Review and reanalysis. *Social Science Research*, 12: 303–329.
- Carroll, G. R., & Huo, Y. P. 1986. Organizational task and institutional environments in evolutionary perspective: Findings from the local newspaper industry. *American Journal of Sociology*, 91: 838–873.
- Charboneau, F. J. 1981. The woman entrepreneur. *American Demographics*, 3(6): 21–23.
- Child, J. 1972. Organizational structure, environment, and performance: The role of strategic choice. *Sociology*, 6: 1–22.
- Cromie, S., & Hayes, J. 1988. Towards a typology of female entrepreneurs. *Sociological Review*, 36: 87–113.
- Cuba, R., Decenzo, D., & Anish, A. 1983. Management practices of successful female business owners. *American Journal of Small Business*, 8(2): 40–46.
- Cummings, L. L. 1988. Organizational decline from the individual perspective. In K. Cameron, R. Sutton, & D. Whetten (Eds.), *Readings in organizational decline: Frameworks, research, and prescriptions*: 417–424. Cambridge, MA: Ballinger.
- Freeman, J., Carroll, G. R., & Hannan, M. T. 1983. The liability of newness: Age dependence in organizational death rates. *American Sociological Review*, 48: 692–710.
- Freeman, J., & Hannan, M. T. 1983. Niche width and the dynamics of organizational populations. *American Journal of Sociology*, 88: 1116–1145.

- Goffee, R., & Scase, R. 1983. Business ownership and women's subordination: A preliminary study of female proprietors. *Sociological Review*, 31: 625-648.
- Goodman, P. S., & Pennings, J. M. 1977. *New perspectives on organizational effectiveness*. San Francisco: Jossey-Bass.
- Hannan, M. T., & Freeman, J. 1977. The population ecology of organizations. *American Journal of Sociology*, 82: 929-964.
- Hirsch, R. D., & Brush, C. 1984. The woman entrepreneur: Management skills and business problems. *Journal of Small Business Management*, 22(1): 30-37.
- Humphreys, M. A., & McClung, H. 1981. Women entrepreneurs in Oklahoma. *Review of Regional Economics and Business*, 6(2): 13-20.
- Kalleberg, A. L. 1986. Entrepreneurship in the 1980s: A study of small business in Indiana. In G. Libecap (Ed.), *Advances in the study of entrepreneurship, innovation, and economic growth*, vol. 1: 157-189. Greenwich, CT: JAI Press.
- Kalleberg, A. L., Marsden, P. V., Aldrich, H. E., & Cassell, J. W. 1990. Comparing organizational sampling frames. *Administrative Science Quarterly*, 35: 658-688.
- Kaufman, H. 1985. *Time, chance, and organizations*. Chatham, NJ: Chatham House.
- Loscocco, K. A., & Robinson, J. 1989. *Barriers to small business success among women*. Albany, NY: State University of New York at Albany.
- Mayer, K., & Goldstein, S. 1961. *The first two years: Problems of small business growth and survival*. Small Business Research Series no. 2. Washington, DC: U.S. Government Printing Office.
- Meyer, A. D. 1988. Organizational decline from the organizational perspective. In K. Cameron, R. Sutton, & D. Whetten (Eds.), *Readings in organizational decline: Frameworks, research, and prescriptions*: 411-416. Cambridge, MA: Ballinger.
- Meyer, M. W., & Zucker, L. G. 1989. *Permanently failing organizations*. Newbury Park, CA: Sage Publications.
- Papalia, D. E., & Olds, S. W. 1981. *Human development*. New York: McGraw-Hill Book Co.
- Pellegrino, E. T., & Reece, B. L. 1982. Perceived formative and operational problems encountered by female entrepreneurs in retail and service firms. *Journal of Small Business Management*, 20(2): 15-24.
- Peters, T. J., & Waterman, R. H., Jr. 1982. *In search of excellence*. New York: Harper & Row Publishers.
- Pfeffer, J., & Salancik, G. R. 1978. *The external control of organizations*. New York: Harper & Row Publishers.
- Reynolds, P. D., & Miller, B. 1989. *New firm survival: Analysis of a panel's fourth year*. Unpublished paper, University of Minnesota Center for Urban and Regional Affairs, Minneapolis, MN.
- Schwartz, E. B. 1976. Entrepreneurship: A new female frontier. *Journal of Contemporary Business*, 5: 47-76.
- Stinchcombe, A. L. 1965. Social structure and organizations. In J. G. March (Ed.), *Handbook of organizations*: 142-193. Chicago: Rand McNally Publishers.
- U.S. Department of Commerce. 1983-1986. *County business patterns*. Washington, DC: U.S. Government Printing Office.
- U.S. Small Business Administration. 1986. *The state of small business: A report of the president*. Washington, DC: U.S. Government Printing Office.
- Venkatraman, N., & Ramanujam, V. 1986. Measurement of business performance in strategy research: A comparison of approaches. *Academy of Management Review*, 11: 801-814.
- Whetten, D. A. 1987. Growth and decline processes in organizations. *Annual Review of Sociology*, 13: 335-358.

- Wholey, D. R., & Brittain, J. W. 1986. Organizational ecology: Findings and implications. *Academy of Management Review*, 11: 513-533.
- Wilkins, J. 1987. *Her own business: Success secrets of entrepreneurial women*. New York: McGraw-Hill Book Co.

Arne L. Kalleberg is a professor in and the Chair of the Department of Sociology, University of North Carolina at Chapel Hill. His current research uses national samples of work organizations and their employees in the United States and Norway to examine issues related to organizational sources of economic inequality, organizational commitment, performance, and economic and sociological aspects of employment contracts.

Kevin T. Leicht is an assistant professor of sociology at the Pennsylvania State University. His research interests include the organizational context surrounding U.S. labor relations, organizational determinants of technological change and innovation, and the political economy of deindustrialization. He is currently doing research on state-level direct investment in high-technology development and the economic consequences of unionization for unorganized workers.

ADAPTIVE CHANGE IN CORPORATE CONTROL PRACTICES

JEFFREY A. ALEXANDER
University of Michigan

Multidivisional organizations are not concerned with what structure to adopt but with how they should exercise control within the divisional form to achieve economic efficiencies. Using an information-processing framework, I examined control arrangements between the headquarters and operating divisions of such organizations and how managers adapted control practices to accommodate increasing environmental uncertainty. Also considered were the moderating effects of contextual attributes on such adaptive behavior. Analyses of panel data from 97 multihospital systems suggested that organizations generally practice selective decentralization under conditions of increasing uncertainty but that organizational age, dispersion, and initial control arrangements significantly moderate the direction and magnitude of such changes.

Recent writings have emphasized the organizational and environmental constraints that inhibit the realization of strategic goals in multidivisional firms, or M-form organizations (Hill & Hoskisson, 1987; Hill & Pickering, 1986; Pitts, 1976, 1977). For example, environmental uncertainty is thought to increase the information-processing requirements of M-form organizations, particularly those that pursue synergistic economies. Such companies may require special control arrangements to operate effectively under such constraints, yet few empirical studies have addressed differences in management control arrangements among M-form organizations and how organizations modify those arrangements in response to environmental contingencies (Hill & Hoskisson, 1987; Hrebiniak & Joyce, 1985). The implications of adaptive change in control practices in M-form organizations extend well beyond simply redefining authority relations between corporate headquarters and operating divisions. The choice of centralized or decentralized control arrangements will, in large part, determine how much latitude individual divisions have to develop and implement competitive strategies in local markets and the efficiency with which corporate headquarters process the information necessary to monitor and adjust the strategic direction of a corporation as a whole. For multidivisional organizations, the critical question is not what structure to adopt but how should control be exercised within the multidivisional structure so that the economic benefits of pursuing a given strategy can be realized? (Hill & Hoskisson, 1987).

This study examined control relationships between the corporate headquarters of multidivisional firms and their operating divisions and the con-

ditions under which such relationships changed. My primary focus was change in corporate decision-making practices in multihospital systems in response to increased environmental uncertainty. Specifically, I addressed the following questions: (1) Do multidivisional organizations alter their patterns of decision making under conditions of increased environmental uncertainty? (2) If patterns of decision making do change, do they become more centralized or more decentralized? (3) What decision-making areas are most likely to be affected by changes in operating environments? and (4) Do specific contextual attributes of multidivisional organizations condition adaptive changes in their decision-making practices?

BACKGROUND

The relationship of internal control practices and environmental uncertainty has long been an interest of organization theorists (Chandler, 1962; Lawrence & Lorsch, 1967; Ouchi, 1979; Thompson, 1967). Contingency and strategy theorists, for example, have argued that an appropriate fit among environmental conditions, control practices, and strategy enhances organizational effectiveness (Miller & Freisen, 1983; Zeithaml, Anderson, & Paine, 1981). However, several important but rarely tested assumptions pervade research on contingency and strategy theory.

The first and perhaps most fundamental assumption is that organizations can adapt their control practices to accommodate major changes in their operating environments. This assumption is central to the ongoing debate between transformation theorists, who argue that organizations are capable of adapting to changing environmental conditions, and selection theorists, who maintain that inertia precludes change in significant features of organizations (Astley & Van de Ven, 1983; Hannan & Freeman, 1977, 1984). Beyond the question of their capacity for adaptive change, however, is the issue of whether organizations that do change their control practices in response to common environmental shifts do so in disparate or similar directions. Disparity of change would suggest that different control arrangements are equally viable under changing environmental conditions. However, if organizations faced with similar environmental changes modify their control practices in a common direction, it may be that they see particular control arrangements as more viable than others in the new environment (Zajac & Shortell, 1989). Whereas previous research has explored this issue in regard to changes in generic strategies (Miles & Snow, 1978; Zajac & Shortell, 1989), little attention has been directed to change in organizational control practices.

The second prevalent theoretical assumption concerns the application of contingency and strategy theories to the corporate level of multidivisional organizations. Both contingency and strategy research have been largely limited to the examination of individual divisions or strategic business units of corporations (Bourgeois, 1980; Ginsberg & Venkatraman, 1985). Researchers have devoted little effort to assessing control practices as a corporate strategy

for managing environmental change (Kimberly & Zajac, 1985). This application is important to the extent that corporate control practices reflect consideration of the environments of multiple divisions as a portfolio rather than consideration of the environment of a single organization. Thus, corporate control arrangements may impose constraints that influence how subsidiary firms or strategic business units pursue their own competitive strategies and operations in local markets (Aldrich, 1979). As corporations diversify, differences between strategy concepts at the business and corporate levels are likely to become quite pronounced (Ginsberg & Venkatraman, 1985).

Finally, previous research on adaptation has not considered the potential influence of the contextual attributes of corporate organizations on their propensity to adapt to environmental change. Authors have noted that the context in which organizations operate refers not only to their environmental situations but also to organizational variables such as structural context (Bauer, 1970), institutional practices (Boeker, 1989; Meyer & Rowan, 1977), and past performance (Hambrick & Schecter, 1983). One possible question is whether large, well-established corporations are more or less likely than small, less established ones to alter their control practices in the face of environmental uncertainty. Researchers have suggested that contextual variables influence both strategy formulation and implementation but have neglected to consider them as contingency factors in their own right (Burgelman, 1983).

Multidivisional Organizations and Corporate Control

In formally structured multidivisional organizations, a corporate body or parent organization holds ultimate power and decision-making authority (Alexander & Fennell, 1986; Mintzberg, 1979). However, as a management strategy, the corporate body's exercise of control through the concentration or delegation of decision-making authority is subject to conflicting motivations. Concentration improves reaction time to conditions that dictate changes in the strategic portfolio of a company and permits tight coordination of interdependent activities among divisions. Decentralization, on the other hand, affords divisions flexibility with which to react to local environmental and operational contingencies (Alexander & Fennell, 1986). The environmental conditions facing an organization—specifically, the level of environmental uncertainty that it faces—will, in part, influence its choice of a control strategy.

Previous work has described environmental uncertainty as the degree to which future states of the world cannot be anticipated and accurately predicted (Lawrence & Lorsch, 1967; Pfeffer & Salancik, 1978). This environmental quality is central to the ability of organizations to acquire and use information in decisions affecting them. For multidivisional firms, an important dimension of uncertainty concerns complexity, change, and competition in local or divisional markets (Hrebiniak & Snow, 1980). In general, the more uncertain the environment in these markets, the more problematic is

corporate decision making, since both the quality and timeliness of information available to corporate decision makers declines with uncertainty. System demands on the internal integration and coordination of divisional activities become more difficult under conditions of environmental uncertainty, increasing the probability of market failure within organizations. Growth in uncertainty and complexity to a level that exceeds the information-processing and decision-making capacity of corporate managers—a condition called bounded rationality (March & Simon, 1958)—characterizes this situation (Scott, 1981; Williamson, 1975, 1981). A structural response to these conditions will aim to simplify informational and decision situations by clearly differentiating between long-range policy decisions rendered by a central office and short-range operational decisions rendered at a divisional level. The goal of such a control strategy is in effect to both diminish the effects of bounded rationality and check local opportunism (Williamson, 1981). Differentiating types of decisions does not imply that one business strategy is appropriate for all divisions. Decentralization dictated by uncertainty in local markets allows each division to determine the appropriate competitive strategy for its particular market conditions.

My basic argument, then, is that product-market uncertainty at a divisional level increases information-processing requirements for multidivisional firms and therefore constrains their ability to realize synergistic and vertical economies and, to a lesser extent, financial economies (Galbraith, 1973; Hill & Hoskisson, 1987; Lawrence & Lorsch, 1967). Therefore, concern for improving the accuracy and timeliness of decision making and reducing its complexity, given less than perfect information, motivates organizational responses to uncertainty. Through selective decentralization of decision making under conditions of uncertainty, multidivisional organizations are relieved of the burden of making complex operational and local strategic decisions at a corporate level and yet can constrain management behavior at a divisional level through performance control systems, management appointments, and shifting resources from one division to another or from divisions to corporate headquarters (Mintzberg, 1979). This argument suggests the following:

Hypothesis 1: Under conditions of increasing uncertainty in local markets, multidivisional organizations will generally decentralize decision-making authority, yielding it to their operating units.

Hypothesis 1a: Under conditions of increasing uncertainty in local markets, multidivisional organizations will decentralize decision-making authority specifically in areas related to the operating policy and strategy of local operating units.

Hypothesis 1b: Under conditions of increasing uncertainty in local markets, multidivisional organizations will not decentralize decision-making authority in the ar-

ease of management accountability and resource allocation.

Contingency Hypotheses

Up to this point, my discussion of adaptation to environmental change has considered multidivisional organizations in general. However, multidivisional organizations are not homogeneous and vary both in their susceptibility to environmental uncertainty and in their propensity to choose certain control strategies over others (Bauer, 1970; Burgelman, 1983; Pitts, 1976, 1977). Specifically, I expected some variation in the tendency of M-form organizations to decentralize to be a function of the interaction of environmental uncertainty and certain contextual attributes of these organizations. This research considered five such attributes: an organization's size, its age, its level of geographic dispersion, its type of ownership and control, and its existing control practices.

M-form organizations, with their decentralized control practices and streamlined information-processing capabilities, can manage a larger span of corporate control than functionally designed organizations. Rendering operating policy decisions at a divisional level presumably frees a corporate headquarters to focus exclusively on financial information from its operating divisions and ignore extraneous or redundant information (Harris, 1983; Mintzberg, 1979; Ouchi, 1977; Peterson, 1984). I anticipated that the inefficiency of interorganizational control via centralized decision making would increase as a function of the increased complexity introduced by the combination of largeness and environmental uncertainty. Those conditions will compel large multidivisional organizations to decentralize decision making further to reduce decision-making complexity at a corporate level and to allow local units to respond effectively to uncertainty in local markets. Small multidivisional organizations, on the other hand, may be less prone than large ones to decentralize under conditions of increasing environmental uncertainty since decision-making complexity is circumscribed by their having fewer divisions and less-differentiated local market conditions.

Hypothesis 2: Under conditions of increasing uncertainty in local markets, decentralization will be more extensive among large multidivisional organizations than among small multidivisional organizations.

Hierarchical controls require considerable time to reach an optimal adjustment in multidivisional organizations. Decentralized authority will be most efficient when an M-form is first instituted because it simply overlays a larger organization on the existing authority structures of individual firms (Kosnik, 1987). This arrangement also allows a flexible response to environmental conditions in the early stages of organizational development and consolidation (Kimberly & Miles, 1981). Further, recently established organizations may be more inclined to respond rapidly to changing environmental conditions because strong inertial pressures to maintain existing control structures and practices are absent (Hannan & Freeman, 1984). I anticipated,

therefore, that relative to older, more established systems, recently established multidivisional organizations will be more adaptive in the face of environmental uncertainty and will seek to decentralize control practices to attain maximum responsiveness in local markets.

Hypothesis 3: Under conditions of increasing uncertainty in local markets, decentralization will be more extensive among more recently formed multidivisional organizations than among established multidivisional organizations.

Geographically concentrated multidivisional firms are more likely to pursue strategies aimed at increasing synergistic economies—strategies that require coordination, resource sharing, or both among divisions. To effect such linkages, headquarters must have an intimate knowledge of the operations of each division and be able to identify possibilities for exchange or joint action. This strategic orientation obviates Williamson's notion of local autonomy for operating divisions and increases the necessity for decision-making authority at a corporate level (Hill & Hoskisson, 1987). Further, uncertainty is less acutely felt in more geographically concentrated systems owing to the homogenizing influence of divisional proximity on markets, clients, suppliers, and their interrelationships. Under such conditions, the inefficiencies associated with centrally managing a set of subsidiary organizations are relatively low.

In M-form organizations in which divisions are regionally or nationally dispersed, inefficiencies will arise with respect to centralized administrative controls as a function of the low sensitivity with which the headquarters of such systems can assess and respond to local market conditions (Alexander & Fennel, 1986; Mintzberg, 1979). Environmental uncertainty exacerbates those conditions because idiosyncratic developments in each geographic area further differentiate local markets. Consequently,

Hypothesis 4: Under conditions of increasing uncertainty in local markets, decentralization will be more extensive among geographically dispersed multidivisional organizations than among geographically concentrated multidivisional organizations.

For some organizations, structural characteristics and organizational practices are an expression of the norms, values, and cultures of the larger organizational social system, irrespective of their relationship to the coordination of production or organizational performance (DiMaggio & Powell, 1983; Scott, 1981). An organization's culture can filter out environmental information that is inconsistent with its values and beliefs (Zammuto & Cameron, 1985). The institutional structures in which organizations are embedded may therefore constrain their propensity to adapt control practices in response to environmental change (Meyer & Scott, 1983; Zucker, 1983). Within a given sector, however, organizations will vary in their exposure to institutional pressures. For example, organizations with religious affiliations, such as Catholic hospitals, are subject to most of the external controls

of secular organizations but are also constrained by the system of values, beliefs, and norms of the religion to which they are linked. Most Catholic hospitals, for example, will not provide abortion services, and many are obliged for religious reasons to provide care to the indigent and uninsured. By contrast, the survival of investor-owned and secular voluntary hospitals depends far less on attaining such socially defined objectives (Alexander & Scott, 1984).

Institutional forces, then, may increase inertia in organizations with highly institutionalized structures, thus reducing the probability of adaptive change in response to environmental uncertainty in local markets. In organizations operating in environments with less institutional development and more technical development, such inertial forces will be weaker, and thus barriers to adaptation will be lower. In this research, I used the ownership or control of a multidivisional organization as a proxy for institutionalization in organizational environments and predicted that organizations with religious affiliations would be under stronger normative, cultural, and value-based constraints than either investor-owned or secular not-for-profit organizations (Alexander & Scott, 1984; Meyer & Rowan, 1977). Hence,

Hypothesis 5: Under conditions of increasing uncertainty in local markets, decentralization will be more extensive among investor-owned and secular not-for-profit multidivisional organizations than among multidivisional organizations owned or controlled by a religion.

Environmental conditions interact with the form or structure of an organization to facilitate or impede adaptive organizational behavior (Hoskisson, 1987). Many researchers and practitioners view organic structures as best suited to companies' and business units' adapting to turbulent environments. An organic structure, characterized by low formalization, high decentralization, and extensive information sharing, enhances an organization's ability to react and adjust to continual environmental change and uncertainty (Ouchi, 1977, 1979; Vancil, 1978). However, for decisions that affect a corporation as a whole, the opposite may hold. Corporate staff members in M-form organizations are specifically charged with monitoring the performance and adjusting the mix of organizational business activities to maintain overall strategic direction. They are presumably in the best position to assess whether the information requirements supporting those functions are appropriate and, if empowered to do so, these staff members can make rapid adjustments to decision-making practices to improve the quality and timeliness of information under conditions of environmental change (Bettis & Hall, 1981). Thus, concentration of decision-making authority at a corporate level may permit more responsive adjustment to environmental contingencies that affect the mix of businesses and markets of the organization.

In M-form organizations that practice decentralized decision making, however, the parochial interests of divisions coupled with low corporate ability to effect change may impede rapid adjustment to changing environ-

mental conditions. In addition, further decentralization under increasing environmental uncertainty may be unnecessary in organizations that already practice such decision making. I predicted, therefore, that systems whose decision-making practices are extremely centralized will be more likely to undergo change in their decision-making practices in response to increasing uncertainty in their environment.

Hypothesis 6: Under conditions of increasing uncertainty in local markets, decentralization will be more likely among multidivisional organizations that exhibit high initial levels of centralization than in those that exhibit moderate initial levels of centralization.

Multihospital Systems and Uncertainty in the Health Care Sector

As a test of my theory, I examined change in the control practices of multihospital systems in response to increasing uncertainty in the health care sector. Multihospital systems, defined as two or more hospitals owned, leased, managed, or sponsored by a separate administrative entity, are now a dominant organizational form in the health care industry; according to data reported in 1988, such systems own or manage 44 percent of all hospitals, representing 44 percent of all community hospital beds (American Hospital Association, 1988; Shortell, 1988). Previous research has demonstrated that these systems vary on a number of dimensions, including size, geographic dispersion, age, ownership and control, and centralization of decision making (Alexander & Fennel, 1986; Luke & Begun, 1988; Provan, 1988). These findings suggest that multihospital systems, like other multidivisional organizations, adopt hybrid structures in an attempt to balance corporate rationality and centralized decision making with a consideration for differences in the market and product orientations of their member hospitals (Mintzberg, 1979). Almost no research, however, has examined how multihospital systems adapt their control policies to changes in their operating environments.

Until the late 1970s, the question of adaptation among health care organizations evoked little interest owing to the relative stability and predictability of the health care sector itself. Hospitals and other health care organizations obtained resources from generous funders like the federal government and state governments, private insurers, and philanthropic donors. Medicare, for example, reimbursed hospitals for whatever they spent on both patient care and administrative overhead. Regulatory constraints served as barriers to entry and ensured that there was virtually no change in the market structure for health services.

During that period, hospitals functioned largely as self-contained, autonomous units. They pursued few interorganizational linkages, given the munificence of environmental resources and the concentration of funding. The efforts of regulatory and planning agencies to control costs suppressed price-based competition among hospitals and further discouraged the establishment of new organizational forms (Cook, Shortell, Conrad, & Morrissey,

1983). The relative homogeneity, slow rate of change, and lack of interconnectedness in the health care environment that existed until the late 1970s justifies describing that environment as one of relative certainty (Lawrence & Lorsch, 1967; Pfeffer & Salancik, 1978; Scott, 1981; Thompson, 1967).

In the early 1980s, however, this state of environmental certainty was turned on its head. The health care sector experienced a number of significant changes, including a radical shift in the payment structure for hospital services from a cost to a fixed-rate basis, a significant increase in the supply of physicians, fragmentation of physician power and autonomy, shrinking capital markets, and rapid technological advancement (Kimberly & Zajac, 1985). Further, public policy no longer sought to ensure access to hospital care for the poor but instead tried to contain hospital costs through competitive mechanisms; that shift increased competition among health care providers for patients, physicians, and health care dollars and promoted a burgeoning of new organizational forms in the health care sector (Goldsmith, 1981). Hospitals now faced intense competition from alternative delivery organizations such as health maintenance organizations (HMOs), preferred provider organizations (PPOs), and free-standing ambulatory care centers. Largely in response to those competitive pressures, linkages among hospitals and other types of health care delivery organizations also increased; linked systems range from highly structured multihospital systems to more loosely coupled hospital consorcia (D'Aunno & Zuckerman, 1987; Ermann & Gabel, 1984, 1986).

The introduction of Medicare's "prospective payment system" in October 1983 deserves particular emphasis in this discussion since it represented a permanent structural change in the environment in which hospitals operate. It resulted in a radically different relationship between hospitals and a major payer—the federal government. Under this system, Medicare pays hospitals a fixed amount for a given diagnosis or procedure rather than paying for all costs incurred. Hospitals can keep the difference between the fixed reimbursement and the actual cost of providing care. Less efficient or less competitive hospitals must pay for cost overruns from internal operating funds. Thus, the new payment system gave hospitals strong incentives to provide efficient, less costly care and simultaneously encouraged competition among providers for patients, physicians, and reimbursement dollars.

Although the changes discussed above were sector-wide, they operated primarily at the local (hospital) level. Previous studies have pointed out that few administrative buffers shield hospitals from environmental change (Alexander & Scott, 1984; Meyer & Scott, 1983). This situation differs markedly from that in other institutional sectors, such as welfare services or public education, where states, counties, and districts often absorb or manage regulatory change and other environmental disturbances.

Uncertainty was increased in local hospital markets as the environmental changes described above lowered the barriers to entry and exit. That lowering increased the potential for new competitors in the market—both new hospitals and alternative providers like home health care programs,

ambulatory care centers, and HMOs. In a constantly changing local market structure, the ability of hospitals to sustain or increase their competitive advantage became problematic. Such market dynamics required rapid local strategic responses. For example, because of the need to be responsive to the entry and exits of competitors in local markets, hospitals had to be able to make decisions regarding expanding, adding, and deleting particular medical services (Starkweather & Carman, 1988; Shortell, Morrison, & Freidman, 1990).

Because exchange relationships between providers, payers, and consumers are based on local market structures, the introduction of uncertainty into these relations reduces the ability of the corporate headquarters of multihospital systems to direct member hospitals' operations in local markets effectively. For example, the introduction of a new ambulatory care facility by a competing hospital will potentially affect the market share, patient flow, and physician relations of a system hospital in that market. Appropriate and timely responses to such developments are based on a complex set of considerations that include market share analysis, social and demographic trends, the strengths and weaknesses of a hospital's medical staff, and its relations with other health care delivery organizations. From a system's perspective, then, uncertainty stems from several sources: (1) inability to predict such developments, (2) connections between the developments and the market elements they affect, and (3) market diversity, or lack of a single integrated market for the services and products of all hospitals in the system. With such uncertainty, systems become less able to render decisions related to domain navigation—the competitive decisions made within a particular product-market environment (Bourgeois, 1980).

METHODS

Data

The unit of analysis for this study was multihospital systems, with a system defined as two or more hospitals owned, leased, managed, or sponsored by an administrative entity separate from the hospitals. Because authority and decision-making relations between corporate headquarters and hospitals significantly differ in systems that manage hospitals by contract and other multihospital systems, I did not consider the former in this research.¹

¹ Severely restricted control and policy-making prerogatives for the system characterize the relationship between a multihospital system that manages hospitals by contract and managed hospitals. The system will typically provide a top-level management team for a hospital and certain support services emanating from its corporate staff. However, the managed hospital retains final decision-making authority over major policy and operating decisions affecting it. Its board is not accountable to the system and, in fact, the system must report to the board regarding major changes in operating strategy for the hospital.

The primary data collection effort consisted of mailing surveys to the chief executive officers (CEOs) of all 252 multihospital systems listed in the 1982 American Hospital Association (AHA) *Directory of Multihospital Systems* and the CEOs of all 257 multihospital systems listed in the 1985 directory (American Hospital Association, 1982, 1985). Data collection periods for the two surveys were the first quarter of 1983 and the last quarter of 1985. I addressed both surveys to CEOs on the assumption that top administrators can provide reliable information about organizational characteristics (Hambrick, 1981; Hrebiniak & Snow, 1980; Tung, 1979). Response rates to the two surveys were approximately the same (65%) although only 97 systems were common to both data collection periods. These common respondents represent the primary study group, or panel, for the investigation. In the aggregate, those systems operated 1,082 hospitals and 207,000 hospital beds in 1983.

Since the loss of 59 systems from the 1983 data represented a serious threat to the internal validity of the study, a descriptive profile of the attributes of those systems is warranted (Table 1). The attrition group was generally comparable on system ownership to the systems reporting for both years, with slightly more investor- and government-owned systems occurring in the former. Similar comparisons on the basis of system size revealed that small systems (those with fewer than four hospitals) were overrepresented in the attrition group. A more detailed assessment of that group indicated that 17 systems ceased operations as independent organizations between 1983 and 1985, primarily through absorption by other systems. An additional 9 systems were not included in the 1985 panel because they were engaged exclusively in contract management of hospitals. Another 6 systems were small Catholic organizations that the Catholic Healthcare Association designated as not having corporate organization.

Merged with the survey data file were data from three additional

TABLE 1
Comparisons of Panel and Attrition Groups, 1983 Data^a

Characteristics	Panel Data	Attrition Group
Ownership		
Government	2%	5%
Religion	47	41
Secular not-for-profit group	40	39
Investors	11	15
Total	100	100
Size		
2	26	34
3-4	24	29
5-9	25	20
≥10	26	17
Total	101	100

^a For the panel data, $N = 97$; and for the attrition group, $N = 59$.

sources: the Area Resource File from the Bureau of Health Professions, the Multihospital System Validation File, and the AHA *Annual Survey of Hospitals* (1983). The Area Resource File provided information on the geographic dispersion of hospitals in systems. The validation file was used to identify the tenure of each hospital in a system, the size and ownership of the system, and the type of affiliation system hospitals had with the parent organization. Finally, the annual survey provided data on the control status, or ownership, of each hospital in a system.

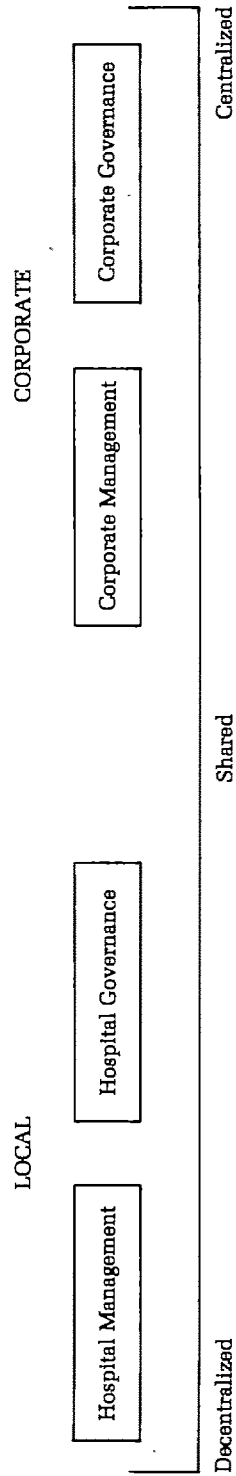
Measurements

Centralization. The primary dependent variable was the degree to which decision making in multihospital systems was centralized or decentralized. For the purposes of this investigation, I defined centralization as the concentration of authority and decision making in an organizational structure. As applied to multidivisional organizations, decision-making authority can vary on a continuum ranging from complete decentralization, with decisions made exclusively by local hospital managements or boards, to complete centralization, with decisions made exclusively by corporate management or boards. In addition, the local and corporate levels of a system may share decision-making authority, as indicated by the middle range of the continuum. Figure 1 illustrates this continuum.

My assessment of centralization also incorporated the potential for variation in the locus of decision making across specific decision categories or dimensions. I considered four decision-making categories incorporating 14 policy areas in this investigation. I derived these categories from Mintzberg's (1979) descriptive theory of divisionalized forms and operationally defined them using a modified delphi technique with a group of ten multihospital system CEOs. The categories included (1) resource allocation, which embraced decisions about the transfer, sale, pledging, or purchase of the assets of a corporation or its divisions; (2) management accountability and control, which referred to decisions affecting the behavior of divisional management, either indirectly through the selection or appointment of managers and board members or directly through the evaluation of management performance; (3) local strategy, which covered decisions affecting divisions' competitive positioning in local markets through planning, diversification, and service and product mix. These decisions are distinct from those affecting the strategic portfolio of a corporation as a whole; they relate, for instance, to the formation of new companies, strategy formulation at a hospital level, and hospital service additions and deletions. (4) Finally, operating policy covers decisions affecting the operating policies of the divisions of a corporation in their local markets. They include decisions affecting changes in hospital bylaws, granting medical staff privileges to admitting physicians, and hospitals' operating and capital budget processes.

CEOs' responses to questions asking them to identify which of four

FIGURE 1
Continuum of Decision-making Authority in Multihospital Systems



entities made decisions in each of 14 areas were the basis of the centralization measures. The four entities were corporate board, corporate management, local (hospital) board, and local management. It is important to note that I asked which entity actually made the decisions rather than the authority or organization legally responsible for decision making in each area, thus emphasizing the operational practice of decision making rather than the formal structure of a system. A second distinguishing feature of the questions on decision making was that respondents could check more than one source of decision making if two or more entities shared responsibility.

Five measures of centralization were developed for the analysis, one overall measure and four content-specific ones. I constructed the first by assigning values of 0 through 2 to responses to each of the 14 decision-making questions. A value of 0 indicated that local management or local board made decisions exclusively; 1 indicated that local and corporate authorities shared decision making; and 2 meant that corporate management or corporate board made decisions exclusively. This scheme resulted in a ranking based on degree of centralization. I then totaled scores for each area and divided the result by the highest possible cumulative score.² Scores were computed for both 1983 and 1985 responses.

To identify the sources of variation in the overall centralization score, I used an identical measurement approach to assess the locus of decision making in each of the four component decision areas—management accountability, resource allocation, operating policy, and local strategy. The elements of these indexes consisted of the individual measurement items falling under each decision category. Reliability tests on eight of the ten centralization indexes resulted in alpha coefficients ranging from .62 to .93. The two exceptions were for management accountability (for 1983, $\alpha = .22$, and for 1985, $\alpha = .42$). Removing the item on the appointment of local board members from these indexes boosted the alpha coefficients over .60, so I omitted the board appointment item from subsequent analyses. Of the ten indexes used in subsequent analyses, eight attained alpha coefficients of .70 or higher and two, alpha coefficients of .62 and .63.

Environmental uncertainty. I captured environmental uncertainty for the time period studied, rather than explicitly measuring it.³ I assumed that

² The maximum possible score varied slightly as a function of how many of the 14 decision questions elicited responses. For example, a few systems did not have local hospital boards, so the item regarding appointment of local board members was not applicable. In that instance, the maximum possible score was 26 rather than 28.

³ I did not use managerial perceptions to measure environmental uncertainty because of data limitations. However, such perceptions decrease in their importance as predictors of organizational structure as competition and uncertainty increase. If managers do not perceive their environment accurately under such conditions, their organization will go out of existence (Aldrich & Pfeffer, 1976). Thus, environment is likely to directly determine organizational design when it severely constrains an organization's performance. I believe that to be the case

(continued)

environmental conditions, such as uncertainty, exist as relative rather than categorical states to key organizational decision makers: a current environment may be more or less uncertain than that of previous periods. Thus, the process of adaptation or accommodation between an organization and its environment most likely occurs by increments rather than through radical transformations. I employed a three-year period for analysis on the assumption that key decision makers used recent environmental conditions as a referent for evaluating current environmental states and formulating the type and degree of control pattern adjustments (Koberg, 1987; Zammuto, 1983).

In addition, the period selected brackets the implementation of Medicare's prospective payment system, which aggravated existing trends toward environmental uncertainty. The introduction of this program cannot be isolated as a cause of environmental uncertainty, but I assumed it to be a major contributor and thus important to consider in the time frame of the investigation.

Organization size. The size of a multihospital system was measured as the number of hospitals it owned, leased, or sponsored. As was discussed, I excluded contract-managed hospitals because the authority relations between these hospitals and multihospital systems do not conform to the divisionalized form or to the continuum of decision-making authority described in Figure 1. Although studies of multihospital systems have sometimes used other measures of system size, such as total revenues and total number of beds, number of hospitals perhaps best reflects potential differences in decision-making complexity resulting from the relations and information exchange between system headquarters and operating divisions (cf. Lewis & Alexander, 1986).

Geographic dispersion. The measure of dispersion used was intended to reflect geopolitical disparities in hospitals' operating environments as well as the approximate physical distances among hospitals operating in a given system. Decision-making uncertainty for system headquarters will increase as a function of both differences in state regulatory climates and physical distance from local hospital markets. The measure was therefore based on the number of states in which a system operated hospitals.

However, dispersion is highly correlated with size: the more hospitals there are in a system, the more dispersed they tend to be. This results in part from antitrust laws precluding an excessive concentration of hospitals owned by single organization in a given market and in part from systems' seeking to operate in different markets to reduce risk. To adjust for the effects of system size on dispersion, I divided the number of states in which a system operated hospitals by the square root of the number of hospitals in

for hospitals and multihospital systems during the 1983–85 period owing to the pervasiveness, visibility, and impact of the prospective payment system and other changes in the health care sector.

the system. This approach gives greater weight to small, broadly dispersed systems than to large, broadly dispersed systems. For example, a system of 4 hospitals operating in two states would receive a dispersion score comparable to that of a system of 16 hospitals operating in four states. The rationale for this approach is that a high concentration of hospitals in one state will result in economies of decision making for a system.

Organizational age. Age was measured as the number of years a system had been incorporated as of 1983. If the date of incorporation was not available, I substituted the affiliation date of the second oldest hospital in the system.

System ownership. Ownership was measured by a series of four binary variables corresponding to ownership by a state or local government, investors, a secular not-for-profit entity, or a religious entity. For purposes of multivariate analysis and isomorphism with the hypotheses, I designated the religious category as the reference group. This category was thus omitted in the multivariate portion of the analysis.

Initial control strategy. Initial control strategy was a system's 1983 score for overall centralization and the four subcategories of centralization.⁴

Data Analysis

The data analysis strategy centered on assessing change in decision making in individual multihospital systems between 1983 and 1985.⁵ To assess such change, I subtracted the 1983 centralization score from the 1985 score for each system providing panel data. Thus, negative differences suggest increasing decentralization and positive scores, increasing centralization. The use of gain or difference scores to assess change in units of observation has been the subject of some controversy (Bohrnstedt, 1969; Harris, 1963; Van Meter, 1974). Two problems in particular have been cited: measurement unreliability and regression toward the mean. To assess potential reliability problems, I first computed alpha coefficients for each of the component measures of the gain scores (e.g., the 1983 and 1985 centralization scores). As was discussed, all ten component scores achieved alphas of .60 or better.

The reliability of change scores also decreases as the association between score components increases. Statisticians consider correlations of .50 between components to be the approximate upper bound for the estimation of stable correlations of change and view such correlations as a special

⁴ All 14 decision-making questions were given equal weight in the computation of the overall centralization score. However, because the subcategories differed with regard to the number of questions, some subcategories contributed more than others to the overall score.

⁵ I considered the extent of the study period adequate for the examination of change in control practices because such practices are conceptualized and measured by degree, not as wholesale or categorical shifts in strategic states. Second, Zajac and Shortell (1989) and Shortell and colleagues (1990) offered some evidence of more pervasive strategic changes in health care organizations occurring in even shorter time periods (two years).

case of multicollinearity (Kessler, 1977). Examination of the correlations between the 1983 and 1985 scores revealed no associations greater than .52.

The practice of taking difference scores across panels has also been subject to the criticism that such differences are an artifact of regression toward the mean. However, regression effects arise primarily when subjects are chosen because of their extreme scores. Because of measurement error and correlation between pre- and post-tests, individual scores will regress toward the mean of the population from which they were selected. But regression effects do not apply to subjects not selected for extreme scores, even if it turns out they manifest such scores. Regression will not occur in such cases because random or extraneous scores of variance affect initial scores in both directions (Campbell & Stanley, 1963). Since I did not select systems to maximize or minimize centralization scores, regression effects should not bias the findings. Further, recent studies suggest that substantive interpretations often account for effects commonly attributed to regression to the mean (Kessler, 1977). For example, organizations that initially operated on either extreme of the centralization continuum may feel the need for more radical strategic adjustment when subjected to increasing environmental uncertainty. These organizations may realign their decision-making practices more severely than those that initially operated toward the middle range of the control continuum.

To test Hypotheses 1, 1a, and 1b, I employed a modified split panel design (Kish, 1987). The primary study group (the panel) consisted of 97 multihospital systems from which data were obtained in the first quarter of 1983 and the last quarter of 1985. Using this panel permitted an assessment of change in individual organizations over the period in response to changes in the operating environment of hospitals, particularly the introduction of Medicare's prospective payment system in October 1983. Although this design has a number of advantages over other periodic sampling approaches, it is also subject to a serious threat to internal validity—attrition. Systematic mortality of survey respondents may bias comparisons. To test for such effects, I compared data from two non-overlapping groups of systems: those that responded to the 1983 survey but not to the follow-up 1985 survey and those that responded only to the 1985 survey. There were 59 systems in the 1983 group and 57 in the 1985 group. I have integrated the results of this comparison into this article but do not present them independently.

Hypotheses 2 through 6 advance arguments regarding the relationship between certain system attributes and the tendency of systems to decentralize their decision making under conditions of environmental uncertainty. I considered the size, geographic dispersion, age, ownership, and initial decision-making practices of each system. To account for possible effects of structural change on change in control practices, I also examined two variables representing proportional change in system dispersion and size from 1983–85, treating these variables as potential alternative explanations of the relationship between system characteristics in 1983 and change in control from 1983 to 1985. I did not include comparable change scores for system

age and ownership in the model since age changes by a constant for all systems and ownership of the systems studied did not change at all over the period of the study.

Ordinary-least-squares regression (OLS) was employed to evaluate the effects of the context variables on change scores in five decision-making categories: overall centralization, management accountability, resource allocation, operating decisions, and local strategy. For each dependent variable, I tested three versions of the model. The first contained the five variables corresponding to system attributes in 1983. The second and third models added proportional change in system dispersion and system size to assess the impact of these variables as alternative explanations of the relationship of 1983 system attributes and change in decision-making practice.

RESULTS

Change in Control Practices

My theoretical focus on adaptation precluded comparison of central tendency measures of independent samples since differences may reflect the net effects of selection processes rather than transformation in individual organizations (Hannan & Freeman, 1984). Therefore, I employed paired t-test comparisons of the 1983 and 1985 panel data to determine the magnitude and direction of change in the decision-making practices of individual systems.

Table 2 presents results of the paired t-tests as well as descriptive characteristics of change in centralization scores over the study period. In 1983, the systems providing data exhibited a mean overall centralization score of .72, indicating that they were, on the average, fairly centralized regarding policy decisions affecting their organizations. An examination of the four subcategories of centralization scores, however, reveals some variation by decision-making area; scores ranged from a low of .61 for operating policy decisions to a high of .82 for resource allocation decisions, with management accountability and local strategy decisions falling between those two extremes. These descriptive findings support my contention that decision making in multidivisional organizations is not uniform but variable according to type of decision.

In support of Hypothesis 1, the mean of the differences in overall centralization between 1983 and 1985 was $-.09$, significant at $p < .001$. This finding suggests that, on the whole, systems delegated decision-making authority to subordinate levels. Of the 97 systems studied, 52 decentralized between 1983 and 1985, 25 centralized, and 20 experienced no change in centralization.

Hypothesis 1a argued that decentralization would be more pronounced in areas related to local strategy and hospital operating policies, whereas Hypothesis 1b predicted less decentralization in areas related to resource allocation and management accountability. As predicted, both operating policy decisions and local operating decisions experienced a decline in cen-

TABLE 2
Change in Centralization

Variables	Means	s.d.	Paired <i>t</i> ^a	Direction of Change		
				Positive	Negative	No Change
Overall centralization						
1985	.63	.26				
1983	.72	.24				
Difference	-.09	.25	-3.69***	25	52	20
Management accountability						
1985	.69	.29				
1983	.71	.31				
Difference	-.10	.37	-0.20	27	28	42
Resource allocation						
1985	.75	.29				
1983	.82	.27				
Difference	-.07	.32	-2.17*	23	35	39
Operating policy						
1985	.52	.31				
1983	.61	.31				
Difference	-.10	.33	-2.84**	25	39	33
Local strategy						
1985	.60	.28				
1983	.75	.27				
Difference	-.15	.29	-5.16***	12	61	24

^a Statistics were computed as $t = \bar{x} \times \sqrt{N/S}$, where \bar{x} is the mean of the differences, N is the number of differences, and S is the standard deviation of the differences.

* $p < .05$

** $p < .01$

*** $p < .001$

tralization. The mean difference in the two scores for operating policy decisions was $-.10$, significant at $p < .01$, and centralization of local strategic decisions declined at an even greater rate, evidenced by a mean difference of $-.15$, significant at $p < .001$. Of the 97 systems, 39 decentralized their operating policy decisions and 61 decentralized local strategic decisions during the study period. These findings provide strong support for Hypothesis 1a.

Findings regarding change in decision-making authority in the areas of management accountability and resource allocation, however, were mixed. Consistent with Hypothesis 1b, management accountability experienced virtually no change between 1983 and 1985. Only 28 of the 97 systems decentralized decision making in this area, compared to 27 that actually increased centralization and 42 that exhibited no change in their decision-making patterns. Change in management accountability decisions did not achieve statistical significance at conventional levels.

Contrary to our predictions, however, the systems studied decentralized resource allocation decisions during the study period. Although the magnitude of this change ($-.07$) was less than that for both operating policy and

local strategic decisions, it was nevertheless statistically significant ($p < .05$). Overall, 35 systems decentralized resource allocation decisions, 23 centralized them, and 39 left practices unchanged.

Because of the potential bias in the panel findings introduced by attrition, I next attempted to check the consistency of the panel results with those obtained through comparisons of the two non-overlapping groups. Results for *t*-test comparisons of overall centralization scores were consistent in strength and direction with those obtained in the analysis of the panel data. Comparisons of component centralization scores were generally consistent, with one notable exception: there were no significant differences between the 1983 and 1985 groups on the index of resource allocation decisions. These results provide reasonable assurance that attrition did not significantly bias the panel data results.⁶

Taken together, the present findings lend considerable support to the thesis that the efficiencies of managing through centralized control may be greater and hence preferable when the operating environments of divisions in multidivisional organizations are relatively stable and predictable. With increased uncertainty, however, centralized control grows inefficient as the quality and timeliness of information available to corporate decision makers deteriorates, thereby compelling systems to delegate decision making to local operating units.

Multivariate Analysis

Table 3 provides group means, standard deviations, and correlations among variables used in the OLS regression models. These correlations suggest varying degrees of association between the component centralization change scores, which range from .24 to .72. Correlations among the independent variables in the model, however, are not sufficiently high to warrant concern about problems of multicollinearity.

Table 4 presents the results of the OLS analyses applied to difference scores in overall centralization. Model 1, containing the 1983 system attributes, was significant at $p < .01$ and achieved an adjusted R^2 of .34. As expected, initial centralization displayed a significant negative association with change in centralization between 1983 and 1985. This finding is consistent with Hypothesis 6, which predicted that systems practicing centralized decision making would experience more severe adaptive changes in the face of significant environmental uncertainty. Hypothesis 4, which predicted a stronger tendency to decentralize among more geographically dispersed systems, also received strong support in the analysis. The 1983 dispersion coefficient was negative and significant at $p < .05$. Consistent with Hypothesis 3, which predicted that old systems would be less likely to decentralize than new systems, a positive and significant coefficient

⁶ Detailed summaries and tables related to this analysis are available from the author.

TABLE 3
Means, Standard Deviations, and Correlations for All Variables in Multivariate Models^a

Variables	Correlations																			
	Means	s.d.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1. Change in overall centralization	-0.09	0.25																		
2. Change in resource allocation	-0.08	0.33	.75																	
3. Change in management accountability	-0.01	0.37	.58	.42																
4. Change in operating policy	-0.09	0.25	.72	.40	.36															
5. Change in strategic decisions	-0.15	0.28	.57	.36	.24	.37														
6. 1983 age	21.00	28.00	.18	.14	.13	.20	.22													
7. 1983 dispersion	1.10	0.67	-.25	.02	-.14	-.18	-.26	-.14												
8. 1983 size	8.00	20.00	-.14	.05	.12	-.02	-.21	-.01	.42											
9. Percentage of change in dispersion	0.01	0.27	-.10	-.02	.07	-.01	.00	.17	-.20	-.07										
10. Percentage of change in size	0.44	1.75	-.13	-.07	.01	.05	-.06	.07	.03	-.05	.53									
11. Government ownership	0.07	0.26	.12	.10	.30	.04	.04	.08	-.22	-.04	.00	-.07								
12. Investor ownership	0.06	0.24	.01	.02	.07	.04	.05	-.09	.35	.59	.06	.12	-.07							
13. Secular not-for-profit ownership	0.41	0.49	.01	.00	-.14	.07	.03	.10	-.16	-.18	-.04	.15	-.23	-.21						
14. Religious ownership	0.46	0.50	-.26	-.21	-.24	-.23	-.19	-.10	.10	-.08	.01	-.17	-.25	-.23	-.77					
15. Overall centralization, 1983	0.72	0.24	-.50	-.39	-.39	-.36	-.16	.23	-.25	-.03	.02	-.10	.31	.00	.24	-.39				
16. Management accountability, 1983	0.70	0.31	-.38	-.20	-.65	-.20	-.04	.08	-.19	-.03	.03	-.08	.27	.07	.20	-.37	.76			
17. Operating policy, 1983	0.61	0.31	-.42	-.27	-.29	-.45	-.04	.28	-.24	-.06	.02	-.17	.35	-.12	.25	-.37	.91	.65		
18. Resource allocation, 1983	0.81	0.28	-.36	-.59	-.17	-.27	-.13	.21	-.08	.06	.03	.03	.19	.12	.07	-.23	.83	.46	.66	
19. Strategic decisions, 1983	0.74	0.28	-.37	-.16	-.29	-.16	-.39	.17	-.31	.06	.01	-.08	.25	.05	.31	-.46	.78	.54	.62	.54

^a N = 97. All correlations above r = .19 are significant at p < .05.

TABLE 4
OLS Multiple Regression Results for Overall Centralization^a

Variables	Difference Scores for Overall Centralization ^b		
	Model 1	Model 2	Model 3
1983 centralization	-1.02** (.15)	-.99** (.16)	-1.07** (.16)
1983 size	-.02E(2) (.002)	-.05E(2) (.002)	-.08E(2) (.002)
1983 dispersion	-.12* (.05)	-.12* (.05)	-.12* (.05)
1983 age	.02E(1)* (.001)	.02E(1)* (.001)	.03E(1)* (.001)
Government ownership	-.12 (.14)	-.10 (.14)	-.10 (.14)
Investor ownership	.23 (.17)	.29† (.17)	.30† (.17)
Secular not-for-profit ownership	.11 (.07)	.12 (.07)	.14† (.07)
Percent change in dispersion		-.12 (.12)	
Percent change in size			-.03† (.02)
Constant	.69** (.13)	.66** (.13)	.73** (.13)
Adjusted R ²	.34	.31	.35
F	7.94**	6.28**	7.56**

^a Unstandardized regression coefficients are reported with standard errors in parentheses.

^b E(n) refers to the number of places to the left of decimal point that mark the true coefficient.

† $p < .10$

* $p < .05$

** $p < .01$

emerged for system age. This finding suggests that older systems are more likely to centralize under conditions of increasing uncertainty than more recently established systems.

Neither size nor system ownership in 1983 was associated with change in overall centralization at conventional levels of significance. The absence of such associations suggests little support for Hypothesis 2, which predicted that large systems would be more likely to decentralize under environmental uncertainty than small systems. Neither do the results support Hypothesis 5, which predicted that investor-owned and secular not-for-profit systems would exhibit a stronger tendency to decentralize under conditions of environmental uncertainty than systems owned by religious entities.

Model 2 adds to the basic model the proportional change in dispersion between 1983 and 1985. Including that variable in the regression analysis does not significantly alter the findings obtained in model 1 and, in particular, does not explain away the significant association of 1983 dispersion and change in overall centralization. The addition of proportional change in system size in model 3, however, does produce some interesting insights into the relationship of size and change in overall centralization. Unlike the 1983 system size coefficient, proportional change in system size was significant and negatively associated with change in centralization at $p < .10$. This

finding suggests that systems that increase in size are those that tend to decentralize their decision-making practices rather than those that are initially large. This pattern of results is opposite to the pattern obtained for system dispersion.

Finally, it is also interesting to note that in model 3, two of the three dummy variables for ownership become significant at $p < .10$. These findings indicate that both investor-owned and secular not-for-profit systems are less inclined than systems owned by a religious entity to engage in overall decentralization in the face of environmental uncertainty. These results run counter to the argument in Hypothesis 5, which predicted that religious systems would be subject to greater inertial pressures than investor-owned and secular not-for-profit systems.

In order to ascertain the source of variation in change in overall centralization, I applied the same methodology to each of the four subcategories of change in decision-making practices. Table 5 shows results of these analyses. Consistent with the findings for change in overall centralization, the 1983 score for all subcategories of centralization was a significant and negative predictor of change over the 1983–85 period. Other effects, however, differed somewhat by the area of centralization under examination. The effects of dispersion, for example, were greatest for local strategy, somewhat weaker but still significant for management accountability and operating policy, and not significant for resource allocation. Similarly, 1983 system age was a strong positive predictor of change in management accountability, local strategy, and resource allocation decisions, but did not display a significant association with change in operating policy decisions. The effects of system ownership on change in centralization appear to be primarily in the areas of local strategic and operating policy decisions. Relative to religious systems, investor-owned and secular not-for-profit systems were more likely to centralize decision-making practices related to local strategy over the study period, whereas only secular not-for-profit systems displayed a positive and significant ($p < .01$) association with change in operating policy decisions.

Locus of Change

Although the present findings generally confirm that multihospital systems tend to adapt to environmental change through change in management control arrangements, they tell us little about the precise locus of these changes. Table 6 displays by year and decision area the percentage of systems in the panel group that practiced decision making at a local level, a corporate level, or on a shared basis. In general, these data suggest a decrease in exclusive corporate control over decision making from 1983 to 1985. Of the 14 decision-making areas, 9 evidenced decreases in exclusive corporate control by 10 percent or more of the panel group. However, no corresponding increase in exclusive local decision-making authority emerged. Although the percentage of systems in which exclusive local control was practiced increased for almost all decision areas, these increases were generally

TABLE 5
OLS Multiple Regression Results for Components of Centralization^a

Variables	Difference Scores ^b											
	Management Accountability			Resource Allocation			Operating Policy			Local Strategy		
	1	2	3	1	2	3	1	2	3	1	2	3
1983 centralization	-1.14** (.14)	-1.14** (.14)	-1.16** (.16)	-1.15** (.15)	-1.12** (.14)	-1.15** (.15)	-.94** (.18)	-.94** (.18)	-.99** (.18)	-.85** (.17)	-.86** (.17)	-.91** (.18)
1983 size	-.04E(1)† (.002)	-.05E(1)† (.002)	-.05E(1)* (.002)	.01E(1) (.002)	.01E(1) (.002)	.08E(2) (.001)	.04E(2) (.002)	.02E(2) (.003)	-.05E(3) (.003)	-.04E(2) (.002)	-.06E(2) (.002)	-.01E(1) (.002)
1983 dispersion	-.11† (.07)	-.12† (.07)	-.11† (.07)	-.04 (.06)	-.04 (.06)	-.04 (.06)	-.14† (.08)	-.15† (.08)	-.14† (.08)	-.16* (.07)	-.17* (.07)	-.16* (.08)
1983 age	.03E(1)** (.001)	.04E(1)* (.001)	.04E(1)* (.001)	.02E(1)† (.001)	.02E(1)† (.001)	.03E(1)* (.001)	.02E(1) (.002)	.02E(1) (.001)	.02E(1) (.002)	.03E(1)* (.001)	.03E(1)* (.001)	.03E(1) (.001)
Government ownership	-.27 (.16)	-.27 (.17)	-.27 (.17)	-.14 (.16)	-.14 (.15)	-.14 (.16)	-.07 (.20)	-.08 (.21)	-.06 (.21)	-.09 (.16)	-.10 (.16)	-.09 (.16)
Investor ownership	.27 (.20)	.28 (.21)	.33 (.22)	.21 (.19)	.22 (.19)	.26 (.20)	.15 (.24)	.17 (.24)	.20 (.24)	.41* (.20)	.44* (.20)	.51* (.20)
Secular not-for-profit ownership	-.10 (.09)	-.10 (.09)	-.08 (.09)	.06 (.08)	.08 (.08)	.08 (.08)	.20† (.11)	.19† (.11)	.22* (.11)	.16† (.09)	.16† (.09)	.20* (.09)
Percent change, dispersion	-.03 (.15)	-.03 (.15)	-.02 (.15)	-.05 (.14)	-.05 (.14)	-.05 (.14)	-.12 (.18)	-.12 (.18)	-.12 (.18)	-.15 (.15)	-.15 (.15)	-.15 (.15)
Percent change, size			-.02 (.02)			-.02 (.02)			-.03 (.03)			-.06* (.02)
Constant	.99** (.13)	1.00** (.14)	1.01** (.13)	.97** (.14)	.97** (.13)	.87** (.14)	.52** (.14)	.53** (.15)	.54** (.15)	.50** (.15)	.52** (.15)	.54* (.15)
Adjusted R ²	.48	.48	.48	.39	.39	.39	.24	.23	.24	.24	.24	.27
F	13.76**	11.92**	12.11**	9.87**	8.52**	8.83**	5.33**	4.63**	4.76**	5.38**	4.78**	5.44*

^a Unstandardized regression coefficients are reported with standard errors in parentheses.

^b E(n) refers to the number of places to the left of the decimal point that mark the true coefficient.

† $p < .10$

* $p < .05$

** $p < .01$

modest, none greater than 10 percent. I am left to conclude—and indeed, the data confirm—that the greatest increases occurred in the category of shared decision making. Participation in shared decision making increased by 10 percent or more in 5 of the 14 decision areas between 1983 and 1985. That finding suggests that the corporate headquarters of multihospital systems have not totally relinquished control over policy-related decisions but instead have adopted mechanisms whereby local business units (hospitals) become important partners of corporate headquarters in rendering such decisions. The process of sharing decision making cannot be determined from our data and clearly represents an important topic for future investigation.

DISCUSSION

The findings of this study support the thesis that multidivisional organizations systematically adapt their control practices to accommodate significant environmental change. Specifically, I found that the multihospital systems studied decentralized decision making, particularly for operational and local strategic decisions, under conditions of increasing uncertainty and competition in local markets. Thus, it not only appears that M-form organizations can adapt, but also that they may see decentralized control as the most viable arrangement under these conditions. The study also supports the notion that certain contextual features of multidivisional organiza-

TABLE 6
Loci of Decision Making

Decision Area	Local		Shared		Corporate	
	1985	1983	1985	1983	1985	1983
Management accountability						
Appointment of hospital CEOs	10%	8%	39%	37%	50%	54%
Hospital CEOs performance evaluation	20	17	33	32	47	51
Appointment of local board members ^a	17	13	37	27	46	60
Resource allocation						
Purchase of assets >\$100,000	19	11	30	30	51	59
Transfer of assets	10	6	28	21	62	72
Pledging of assets	9	7	31	19	60	74
Sale of assets	8	8	31	17	61	74
Operating policy						
Change in hospital bylaws	14	10	41	20	44	70
Medical staff privileges	67	62	11	7	21	31
Hospital operating budget	21	15	49	44	30	41
Hospital capital budget	18	12	50	48	32	40
Local strategy						
Formation of new companies	9	6	28	11	63	83
Hospital strategy formulation	18	15	48	43	33	41
Hospital service additions and deletions	34	27	42	39	24	35

^a Appointment of local board members was not included as a component of the management accountability index because of its poor contribution to reliability.

tions—notably, dispersion, age, and initial decision-making practices—influence the manner in which organizations modify decision-making practices in response to changing environmental circumstances. Those contextual features affect both the magnitude and direction of adaptive change. The mediating effects of those organizational properties on changes in decision making suggest that M-form organizations are not homogeneous but variant on a number of important organizational characteristics that influence their ability or willingness to respond to exogenous conditions.

In general, then, my findings align with those of strategic management theorists who consider change in control practices in M-form organizations a critical managerial response to environmental uncertainty (Hill & Hoskisson, 1987). Further, the direction and locus of adaptive changes found here generally reinforce the views of Galbraith (1973), Williamson (1981), and others who have argued that control practices reflect multiple organizational goals. These goals include reducing decision-making complexity and market failure within an organization and maintaining the capacity to limit opportunistic behavior at a divisional level and to control the strategic direction of the corporation as a whole. Results of the contextual analysis indicate, however, that certain types of multidivisional organizations may be less able or less willing to engage in such adaptive change, thus lending at least some conditional support to the role of inertia in precluding such change (Hannan & Freeman, 1984).

The foregoing conclusions must be considered in light of several limitations of the study. First, I did not explicitly measure environmental uncertainty, using the time period of the study as a proxy for it. To the extent that such a proxy does not accurately capture the degree or pervasiveness of uncertainty in local markets, alternative explanations of change in control practices may assume much importance. Second, the three-year time period of the investigation was relatively short. Ideally, change in control practices would be evaluated over a longer period to capture possible change fluctuations or punctuated change patterns. Finally, my measure of corporate control practices relied exclusively on the responses of the systems' CEOs. A more valid measure might draw on responses from managers directly involved in decisions at corporate and divisional levels.

In practice, it may be relatively easy for the parent company or corporate headquarters of a multidivisional organization to dictate changes in management control practice to subordinate organizations. First, and probably most important, the headquarters of formally structured systems are empowered to make changes in these policies since the distribution of authority between divisions and corporation is clear-cut and absolute. Second, the physical separation of corporate headquarters from operating units lends itself to the separation of strategic decisions for a system as a whole and operating decisions for the divisions. This means that headquarters are both structured and staffed for such decision making and not disconcerted by conflicts and demands among operating units. Indeed, a particular advantage of the divisionalized form may be that its structure permits relatively

rapid adaptation to environmental change. Future studies need to examine whether or not this represents an advantage for operating divisions in terms of operating effectiveness, market share, and growth.

Several specific findings are worth noting. Although the multihospital systems studied here displayed a general tendency to decentralize during the study period, the magnitude of change was relatively modest ($-.007$ to $-.151$). Change in decision-making practices appears to be a process of incremental adaptation to shifting environmental conditions rather than a radical restructuring of control arrangements. Such an incremental pattern suggests that key corporate decision makers continually evaluate prior decisions and base changes on the perceived success or lack of success of those decisions. The relatively small modifications to decision-making practices found here may also indicate that major shifts in control arrangements may be subject to some inertial pressures, as organizational ecologists have suggested. Adaptive change does occur in response to changes in environmental states, but these changes may not be acute enough to alter the fundamental character or form of an organization, at least over the short term.

Another explanation for the modest incremental change found may relate to the potential dilemma of adaptation precluding adaptability. Corporate managers may see radical shifts in decision-making practices as limiting their options for reacting to different contingencies in the future. For example, it may be more difficult for a system that has completely decentralized its decision-making arrangements to centralize them should environmental uncertainty diminish or strategies be refocused on attaining synergistic economies.

Taken together, my results suggest that control arrangements in M-form organizations are not rigid, categorical programs that remain immutable in the face of changing market conditions. Rather, they appear to be procedures that are adjusted by degree as environmental conditions dictate.

Organizational size was not a significant contextual predictor of change in decision-making practices in this study. One explanation is that large multidivisional organizations have multiple layers of administration that include regional offices to manage certain product lines or groups of divisions. Our assessment of changes in decision-making practices involving the local hospital units and central headquarters of multihospital systems did not account for the potential existence of intermediate levels of administration in M-form organizations. To the extent that adaptive changes in large systems may have occurred in arrangements between local hospital units and, for example, regional administrative units, I may have omitted an important component of the decision-making hierarchy. Clearly, future investigations should attempt to assess the role of such intermediate layers of decision-making hierarchies within corporate structures.

A second prediction not supported by our findings was that decisions related to resource allocation in multidivisional organizations would remain unchanged in the face of environmental uncertainty. Although the results suggest that such decision making is decentralized under conditions of in-

creasing local market uncertainty, such changes are relatively modest in magnitude. In fact, comparisons of the various centralization scores for 1983 and 1985 reveal that resource allocation is the most centralized of the four component areas of decision making examined in the study (.82 and .75, respectively). Change in decision-making practices, therefore, does not necessarily suggest categorical shifts in control arrangements. Indeed, a conceptual distinction needs to be drawn between decentralized organizations and organizations that decentralize. Questions of adaptation must necessarily focus, as I did, on the latter.

The study illustrates the utility of assessing centralization as a multidimensional rather than unidimensional construct. Although all the systems studied evidenced general decentralization from 1983 to 1985, a more detailed analysis by decision-making categories revealed that this general tendency was attributable largely to changes in such specific areas as operating policy and local strategy. Particularly striking was the marked decentralization of local strategic decisions during the study period. Of the four decision areas considered, local strategy experienced the most pronounced change. This finding tends to support the idea that the ability to react effectively to local market uncertainty depends on corporate operating units receiving much authority to develop competitive strategies in their markets. From a corporate perspective, such control arrangements considerably reduce the potential burden of monitoring and reacting to local market conditions.

The absence of change in other decision areas nevertheless has specific implications for the control arrangements in multidivisional organizations. For example, despite increased local control over operating policy and local strategic decisions in 1983–85, a concomitant change toward management accountability to local authorities was not found among the multihospital systems studied. This lack suggests that hospital managers had more latitude than before to pursue policies that enhanced the competitiveness, productivity, and success of their hospitals, but that success continued to be defined at a corporate level. Given the separation of operating units and corporate headquarters, performance-related data are a key element in the accountability process. A standardized performance control system is likely to emphasize financial measures, since they are easily assessed and the transaction costs of processing such information are low. Thus, the rather strong trends toward decentralization during the study period does not suggest that hospital managers had a totally free hand in operating their organizations. Rather, decentralizing policies are probably bottom-line-driven, with a tendency to suppress goals and practices that are not profitable, like indigent care and non-cost-effective services. By extension, these results may also signal an increase in turnover among hospital managers as failure to achieve such measurable objectives becomes more evident to corporate staff members evaluating management performance.

Although my analysis focused on health care systems, I believe the findings extend to M-form organizations in other industries experiencing profound deregulation (e.g., airlines, banking) and increased competition. It

should be noted, however, that most health care systems practice what Mintzberg (1979) called incomplete divisionalization. Hospitals in multi-hospital systems are differentiated primarily on the basis of markets rather than products or services. Health care systems, however, vary in the strategies they pursue. Some—typically, those that are large and geographically dispersed—will attempt to achieve financial economies through operating a large number of hospitals in multiple markets. Other hospital systems emphasize strategies aimed at achieving synergistic economies (Shortell, 1988). For example, two system hospitals in the same local or regional market might achieve such synergies through patient referrals and transfers, sharing expensive technologies, and providing complementary arrays of services. In either case, however, a corporation must be cognizant of the level of uncertainty in local hospital markets and must consider the collective impact of such uncertainty on the organization as a whole. To tailor control systems to the circumstances of each hospital essentially obviates the potential economic or synergistic efficiencies of a multihospital system. A pluralistic approach to control arrangements renders such policies inconsistent and confusing to operating divisions and considerably increases the administrative burden on corporate staff members. However, future research might test the thesis that the corporate office of a multidivisional organization uses different control arrangements for different segments of its units, differentiating, for instance, geographically concentrated and geographically dispersed areas and recently acquired and long-term system participants. Such tests would address whether there are situations in which concerns of autonomy and effectiveness outweigh those of efficiency.

This study rests on the assumption that corporate managers equate uncertainty with variance and volatility in local market conditions. My argument regarding the adaptation of control practices has focused on that dimension of uncertainty. However, it is likely that other factors not considered in this study may also affect control arrangements. The generic strategy an organization pursues (diversification or differentiation, for example) and the management processes it uses to implement that strategy may also bear on adaptive changes in decision-making processes. An additional area for further research is the relationship between an organization's product-market strategy and the extent to which the implementation of that strategy is centralized or decentralized in different kinds of multidivisional organizations.

REFERENCES

- Alexander, J. A., & Fennell, M. L. 1986. Patterns of decision making in multihospital systems. *Journal of Health and Social Behavior*, 27: 14–27.
- Alexander, J. A., & Scott, W. R. 1984. The impact of regulation on hospital administrative structure. *Hospital and Health Services Administration*, 29(3): 71–85.
- Aldrich, H. 1979. *Organizations and environments*. Englewood Cliffs, NJ: Prentice-Hall.
- Aldrich, H., & Pfeffer, J. 1976. Environments of organizations. *Annual Review of Sociology*, 2: 121–139.

- American Hospital Association. 1982. *Directory of multihospital systems* (2d ed.). Chicago: American Hospital Publishing.
- American Hospital Association. 1985. *Directory of multihospital systems*. Chicago: American Hospital Publishing.
- American Hospital Association. 1988. *Hospital statistics* (1988 ed.). Chicago: American Hospital Publishing.
- Astley, W. G., & Van de Ven, H. 1983. Central perspectives and debates on organization theory. *Administrative Science Quarterly*, 28: 245-273.
- Bauer, J. 1970. *Managing the resource allocation process*. Cambridge, MA: Harvard University Press.
- Bettis, R. A., & Hall, W. K. 1981. Strategic portfolio management in the multibusiness firm. *California Management Review*, 23(1): 24-38.
- Boeker, W. 1989. Strategic change: The effects of founding and history. *Academy of Management Journal*, 30: 489-515.
- Bohrnstedt, G. W. 1969. Observations on the measurement of change. In F. Borgatta (Ed.), *Sociological methodology*: 113-133. San Francisco: Jossey-Bass.
- Bourgeois, L. J. 1980. Strategy and environment: A conceptual integration. *Academy of Management Review*, 5: 25-39.
- Burgelman, R. H. 1983. A model of the interaction of strategic behavior, corporate content, and the concept of strategy. *Academy of Management Review*, 8: 61-70.
- Campbell, D. T., & Stanley, J. C. 1963. *Experimental and quasi-experimental designs for research*. Chicago: Rand McNally & Co.
- Chandler, A. 1962. *Strategy and structure*. Cambridge, MA: MIT Press.
- Cook, K., Shortell, S. M., Conrad, D., & Morrissey, M. 1983. A theory of organizational response to regulation. *Academy of Management Review*, 8: 193-205.
- D'Aunno, T., & Zuckerman, H. 1987. A lifecycle model of organizational federations: The case of hospitals. *Academy of Management Review*, 12: 534-545.
- DiMaggio, P., & Powell, W. W. 1983. The iron cage revisited: Institutional isomorphism and collective rationality in organizational fields. *American Sociological Review*, 48: 147-160.
- Ermann, D., & Gabel, J. 1984. Multihospital systems: Issues and empirical findings. *Health Affairs*, 3: 50-64.
- Ermann, D., & Gabel, J. 1986. Investor-owned multihospital systems: A synthesis of research findings. In B. Gray (Ed.), *For-profit enterprise in health care*: 474-491. Washington, DC: National Academy Press.
- Galbraith, J. 1973. *Designing complex organizations*. Reading, MA: Addison-Wesley.
- Ginsberg, A., & Venkatraman, N. 1985. Contingency perspectives of organizational strategy: A critical review of the empirical research. *Academy of Management Review*, 10: 421-434.
- Goldsmith, J. C. 1981. *Can hospitals survive? The new competitive health care market*. Homewood, IL: Dow Jones-Irwin.
- Hambrick, D. C. 1981. Environment, strategy, and power within top management teams. *Administrative Science Quarterly*, 26: 253-276.
- Hambrick, D. C., & Schecter, S. 1983. Turnaround strategies for mature industrial-product business units. *Academy of Management Journal*, 26: 231-248.
- Hannan, M. T., & Freeman, J. 1977. The population ecology of organizations. *American Journal of Sociology*, 82: 929-964.
- Hannan, M. T., & Freeman, J. 1984. Structural inertia and organizational change. *American Sociological Review*, 49: 149-164.

- Harris, B. C. (Ed.). 1963. *Problems in measuring change*. Madison: University of Wisconsin Press.
- Harris, B. C. 1983. *Organization, the effect of large corporations*. Ann Arbor, MI: UMI Research Press.
- Hill, C. W. L., & Hoskisson, R. E. 1987. Strategy and structure in the multiproduct firm. *Academy of Management Review*, 12: 331-341.
- Hill, C. W. L., & Pickering, J. F. 1986. Divisionalization, decentralization and performance of large UK companies. *Journal of Management Studies*, 23: 26-50.
- Hoskisson, R. E. 1987. Multidivisional structure and performance: The contingency of diversification strategy. *Academy of Management Journal*, 30: 625-644.
- Hrebiniak, L. G., & Joyce, W. F. 1985. Organizational adaptation: Strategic choice and environmental determinism. *Administrative Science Quarterly*, 30: 336-349.
- Hrebiniak, L. G., & Snow, C. C. 1980. Industry differences in environmental uncertainty and organizational characteristics related to uncertainty. *Academy of Management Journal*, 23: 750-759.
- Kessler, R. C. 1977. The use of change scores as criteria in longitudinal survey research. *Quality and Quantity*, 11: 43-66.
- Kimberly, J. R., & Miles, R. H. 1981. *The organizational life cycle*. San Francisco: Jossey-Bass.
- Kimberly, J. R., & Zajac, E. J. 1985. Strategic adaptation in health care organizations: Implications for theory and research. *Medical Care Review*, 42(2): 267-302.
- Kish, L. 1987. *Statistical design for research*. New York: Wiley.
- Koberg, C. S. 1987. Resource scarcity, environmental uncertainty, and adaptive organizational behavior. *Academy of Management Journal*, 30: 798-807.
- Kosnik, R. D. 1987. Coordination and control in multihospital systems: The role of the board of directors. *Academy of Management Proceedings*: 91-95.
- Lawrence, P. R., & Lorsch, J. 1967. *Organizations and environments: Managing differentiation and integration*. Boston: Harvard University Graduate School of Business Administration.
- Lewis, B. L., & Alexander, J. A. 1986. A taxonomic analysis of multihospital systems. *Health Services Research*, 21(1): 461-475.
- Luke, R. D., & Begun, J. W. 1988. Strategic orientations of small multihospital systems. *Health Services Research*, 23(5): 597-618.
- March, J. G., & Simon, H. A. 1958. *Organizations*. New York: Wiley & Sons.
- Meyer, J. W., & Rowan, B. 1977. Institutionalized organizations: Formal structure as myth and ceremony. *American Journal of Sociology*, 83: 340-363.
- Meyer, J. W., & Scott, W. R. 1983. *Organizational environments: Ritual and rationality*. Beverly Hills, CA: Sage Publications.
- Miles, R. E., & Snow, C. C. 1978. *Organizational strategy, structure and process*. New York: McGraw-Hill Book Co.
- Miller, D., & Friesen, P. H. 1983. Strategy making and the environment: The third link. *Strategic Management Journal*, 4: 221-235.
- Mintzberg, H. 1979. *The structuring of organizations*. Englewood Cliffs, NJ: Prentice-Hall.
- Ouchi, W. G. 1977. The relationship between organizational structure and organizational control. *Administrative Science Quarterly*, 29: 573-597.
- Ouchi, W. G. 1979. A conceptual framework for the design of organizational control systems. *Management Science*, 25: 833-847.

- Peterson, K. D. 1984. Mechanisms of administrative control over managers in educational organizations. *Administrative Science Quarterly*, 29: 573–597.
- Pfeffer, J., & Salancik, G. 1978. *The external control of organizations*. New York: Harper & Row Publishers.
- Pitts, R. 1976. Diversification strategies and organizational policies for large diversified firms. *Journal of Economics and Business*, 28(3): 181–188.
- Pitts, R. 1977. Strategies and structures for diversification. *Academy of Management Journal*, 20: 197–208.
- Provan, K. G. 1988. Organizational and decision unit characteristics and board influence in independent vs. multihospital system-affiliated hospitals. *Journal of Health and Social Behavior*, 29: 239–252.
- Scott, W. R. 1981. *Organizations: Rational, natural, and open systems*. Englewood Cliffs, NJ: Prentice-Hall.
- Shortell, S. M. 1988. The evolution of hospital systems. Unfulfilled promises and self-fulfilling prophecies. *Medical Care Review*, 45(2): 177–214.
- Shortell, S. M., Morrison, E. M., & Freidman, B. 1990. *Strategic choices for America's hospitals: Managing change in turbulent times*. San Francisco: Jossey-Bass.
- Starkweather, D. B., & Carman, J. M. 1988. The limits of power in hospital markets. *Medical Care Review*, 45: 5–48.
- Thompson, J. D. 1967. *Organizations in action*. New York: McGraw-Hill Book Co.
- Tung, A. 1979. Dimensions of organizational environments: An exploratory study of their impact on organizational structure. *Academy of Management Journal*, 22: 672–693.
- Vancil, R. A. 1978. *Decentralization: Managerial ambiguity by design*. Homewood, IL: Dow Jones-Irwin.
- Van Meter, D. S. 1974. Alternative methods of measuring change: What difference does it make? *Political Methodology*, 3(1): 125–140.
- Williamson, O. E. 1975. *Markets and hierarchies*. New York: Free Press.
- Williamson, O. E. 1981. The modern corporation: Origins, evolution, attributes. *Journal of Economic Literature*, 29: 1537–1568.
- Zajac, E. J., & Shortell, S. M. 1989. Changing generic strategies: Likelihood, direction and performance implications. *Strategic Management Journal*, 10: 413–430.
- Zammuto, R. F. 1983. Growth, stability, and decline in American college and university enrollments. *Educational Administration Quarterly*, 19: 83–99.
- Zammuto, R. F., & Cameron, K. 1985. Environmental decline and organizational response. *Research in Organizational Behavior*, 7: 223–262.
- Zeithaml, C. P., Anderson, C. R., & Paine, F. T. 1981. An empirical reexamination of selected PIMS findings. *Academy of Management Proceedings*: 12–16.
- Zucker, L. 1983. Organizations as institutions. In S. B. Bacharach (Ed.), *Advances in organizational theory and research*, vol. 2: 53–111. New York: JAI Press.

Jeffrey A. Alexander is an associate professor in the Department of Health Services Management and Policy, School of Public Health, University of Michigan. He received his Ph.D. degree from Stanford University. His current research focuses on governance in health care organizations, organizational responses to competition, and interorganizational relations.

RESEARCH NOTES

© Academy of Management Journal
1991, Vol. 34, No. 1, 194–204.

BEHAVIORAL COMMITMENT AND TENURE OF NEW EMPLOYEES: A REPLICATION AND EXTENSION

CATHY J. KLINE

St. Leo College

LAWRENCE H. PETERS

Texas Christian University

The impact of perceptions of volition, revocability, and publicness on behavioral commitment and the impact of behavioral commitment on employee tenure were examined in a group of 315 newly hired clerical employees. Results based on correlational and survival analyses tended to replicate prior research by O'Reilly and Caldwell by showing that behavioral commitment has a substantial impact on employee tenure and that there are relationships between behavioral commitment and perceived volition, publicness, and revocability. We also found support for an extended model of behavioral commitment based on significant relationships involving a number of hypothesized situational and individual difference precursors of volition, revocability, and publicness.

Drawing on the extensive dissonance literature, Salancik (1977a,b) suggested that commitment is the result of a process by which people become psychologically bound to their actions in such a way that they feel a sense of personal obligation to follow through on the implications of those actions. This model, which stands in contrast to prior attitudinal conceptualizations of commitment (e.g., Mowday, Steers, & Porter, 1979), is often referred to as the behavioral commitment model (Staw, 1977). According to Salancik (1977b), people become committed to the implications of their own actions to the extent that those actions are associated with three key perceptual states—volition, revocability, and publicness.

Volition refers to the perception that an action has been undertaken out of free choice. When perceived volition is high, an individual should feel more personally responsible for an act than when perceived volition is low and, therefore, should feel a need to justify the wisdom of the choice made by behaving in a manner consistent with it.

This article is based on data collected by the first author as part of her doctoral dissertation research. We would like to thank two anonymous reviewers for this journal for their thoughtful comments and suggestions.

Revocability refers to the perceived reversibility of an action. Salancik (1977a) argued that people undertake some actions on a trial basis because the perceived costs—tangible, psychological, or both—of revoking such acts are minimal. If things do not work out, they will try something else. People undertake other behaviors, however, believing that they will incur substantial costs by revoking their action. The more an individual perceives that behavior cannot be reversed without high costs, the higher the commitment to the chosen course of action should be.

Publicness is the perception that significant others are aware of an action. Because public acts are known to such significant others as family members, friends, and peers, behavior that is inconsistent with them has stronger psychological implications than behavior that is inconsistent with private acts. Thus, the more a person perceives significant others to be aware of an act, the more committed the individual should be to a future course of action consistent with it.

In summary, Salancik (1977a, b) defined commitment as a psychological obligation to behave in a manner consistent with the implications of prior behavior. Acts will become committing and thus constrain future behavior to the extent that people see them as undertaken by the exercise of free choice, not easily reversed, and known to significant others. Those three conditions represent high volition, low revocability, and high publicness.

OVERVIEW OF THIS RESEARCH

Behavioral Commitment and Early Job Withdrawal

Job acceptance is an identifiable act on the part of applicants that implies their willingness to maintain a continuing relationship with an organization. The more committed applicants are to the act of job acceptance, the greater should be their job longevity. According to Salancik's model, the extent to which high volition, low revocability, and high publicness characterize an act of job acceptance, applicants' behavioral commitment should increase.

O'Reilly and Caldwell (1981) examined Salancik's (1977a) model in precisely this context. Their results indicated that both volition and revocability had significant relationships with behavioral commitment and that behavioral commitment and turnover were significantly associated. The present investigation replicates O'Reilly and Caldwell's study and extends that work in an important way. O'Reilly and Caldwell examined the effects of perceptual states on later behavioral commitment and turnover but did not explicitly examine factors that might influence those perceptual states. In fact, their operational definitions appear to have confounded the measurement of perceptual states with that of various situational elements that might influence them. For example, only one of four items they used to assess perceived volition appeared to be tapping that perceptual state directly, by asking respondents the degree to which they believed they made their job choice on the basis of external pressures. The other three items

more clearly focused on specific situational precursors, such as the number of actual job offers respondents had to choose from. The distinction between the perceptual states of volition, revocability, and publicness and the situational and individual difference precursor variables hypothesized to lead to those perceptions is a key theoretical distinction and the focus of our extension of O'Reilly and Caldwell's study.

Precursors to Volition, Revocability, and Publicness

Although an extensive review is beyond the scope of this article, research in both dissonance and organizational behavior suggests a number of individual and situational factors that should influence people's perceptions of volition, revocability, and publicness with regard to the act of accepting a job offer. Previous research has found that the extent to which people (1) choose among multiple alternatives (e.g., Brehm, 1956; Mowday & McDade, 1979), (2) have complete and accurate information regarding their choice (Ilgen, 1975; Mowday & McDade, 1979), and (3) see rejected alternatives as attractive (Festinger, 1957) enhance perceptions of volition.

Stevens, Beyer, and Trice (1978) suggested an individual difference variable potentially important as a precursor to perceived revocability. They proposed that individuals vary in the degree to which they value change and that people with a positive "attitude toward change" would perceive changing their organizations as an acceptable response to increased costs of participation. Applied to the present context, people with a generally favorable attitude toward job change are likely to see a reversal in an initial job choice decision as a more viable alternative than those holding a less favorable attitude toward job change.

On the basis of work on dissonance theory, Salancik (1977a, b) proposed that the extent to which others significant in a person's life are aware of behavior heightens the person's perceptions of publicness. In the present context, the greater the proportion of a newly hired person's significant others who are aware of a job choice decision, the greater the perception of publicness. It also seemed likely that people having more friends and relatives currently employed by the chosen firm would perceive greater publicness associated with their decision than those with fewer such connections.

Survival Analysis

A methodological refinement of O'Reilly and Caldwell's study involved the use of survival analysis, a method designed specifically for examining behavioral processes in which some event—for example, job termination—occurs to different people at differing times. In this study, the focal event was leaving a job. Using survival analysis allowed us to focus on retention time rather than job termination itself and thus to avoid many of the methodological drawbacks associated with typical turnover research designs (cf. Peters & Sheridan, 1988).

Information regarding employee tenure was used to model the cumulative proportion of newly hired employees who remained employed at the

end of each of several consecutive seniority intervals (Morita, Lee, & Mowday, 1989; Peters & Sheridan, 1988). This pattern is the basic cumulative survival function. At the time of hiring, the cumulative survival function equals 1.00, but as time passes, the proportion of new people who remain employed with an organization begins to drop. Different survival functions characterize organizations that have different retention experiences. In this manner, survival analysis can be used to describe the pattern of employee retention over time.

A number of statistics that characterize survival functions can also be computed. For example, a researcher can estimate the proportion of newly hired people still likely to be employed at the end of a given seniority interval, such as two months. Alternatively, a researcher can compute an index called the employment half-life (Peters & Sheridan, 1988) to estimate when 50 percent of the people hired at a given time are likely to have left the hiring organization. Other indexes can also be computed, but what was important here was that survival analysis allowed us to test theoretical propositions by comparing subgroups that differed in theoretically relevant ways by use of a nonparametric test distributed as a chi-square function (Lee & Desu, 1972).

METHODS

Respondents

Respondents in this research were 315 clerical employees hired to fill permanent positions in the credit department of a large, national retailer between November 1980 and November 1981. New employees in 18 credit departments located in several southwestern and eastern coastal states participated in this research. Their average age was 24.7 years; 75 percent were white, 81 percent were women, 59 percent were single, and 89 percent had at least a high school education.

Procedures

Personnel department representatives at each location administered a questionnaire that contained all key measures on the employees' first day at work. The questionnaire explained the purpose of the study, assured the participants of confidentiality, and requested their voluntary participation. Only one person declined. Participants received time to complete the questionnaire at work and were asked to mail it directly back to the first author. Turnover was assessed by examining company records six months after the last person entering the study was hired.

Measures

Items were written specifically to assess behavioral commitment, volition, revocability, publicness, and attitude toward job change. We collected pilot data to investigate the psychometric properties of each of those measures. All items chosen for use in this research were based on results of item

and principal components analyses, data on scale reliabilities, and consideration of the written comments and suggestions of pilot respondents. The items composing all scales as well as results from both pilot research and the current study pertaining to the psychometric properties of these scales are available upon request from the first author. Respondents answered each item on a Likert-type scale with values ranging from strongly disagree, 1, to strongly agree, 5.

Volition. Five items reflected the extent to which respondents perceived themselves as having had free choice in making their job acceptance decisions. An example item is, "I felt pressured into accepting this job" (reverse scored). Responses were summed, with high scores indicating greater perceived volition; coefficient alpha for this scale was .70.

Revocability. Three items reflected the extent to which respondents perceived their chosen course of action as final rather than reversible. An example is, "I am trying out this job to see if it works out." Responses were summed ($\alpha = .73$).

Publicness. Three items reflected the extent to which respondents saw significant others as knowing of their job choice decision. An example is, "Not many people who I care about know of my decision to take this job" (reverse scored). We summed responses ($\alpha = .66$).

A principal components analysis with varimax rotation conducted on the 11 items described above indicated three underlying factors, with each set of items loading only on its appropriate factor.

Behavioral commitment. Three items reflected the extent of respondents' perceived obligation to follow through on the implications of their actions. An example is, "I do not feel obligated to stick with this job" (reverse scored). We summed responses ($\alpha = .70$).

Precursors to volition, revocability, and publicness. We included several single-item questions on the questionnaire as measures of hypothesized situational precursors. Precursors of volition included the number of job offers respondents had received, the amount of information they had about their new jobs, the accuracy of the information they had about their new jobs, and the perceived attractiveness of the next best job offer they had received. The last three variables were assessed on seven-point scales. Precursors of publicness included an index assessing the proportion of significant others respondents had told of their job choices and an item asking the number of friends and relatives employed at the same store. We assessed no situational precursors of revocability.

In addition to these situational variables, we assessed one individual difference variable hypothesized to be a precursor of revocability. Four items for which responses were on a five-point scale measured attitudes toward job change; an example item is, "A person who changes organizations often will be judged as unstable by others." We summed responses ($\alpha = .76$).

Length of tenure. The observation period for assessing tenure extended from November 1980 to six months after the hiring date of the last person who entered the study, a total observation period of 18 months. We mea-

sured tenure as the number of days a respondent was employed from date of hire until date of termination or until the end of the observation period.

The fact that study participants began employment at different dates and therefore had differing lengths of time to decide to stay or quit was not necessarily a problem for survival analysis (cf. Peters & Sheridan, 1988). The nonparametric survival modeling we employed (Berkson & Gage, 1950) allowed us to examine the proportion of employees who survived to the end of each of a series of consecutive two-month seniority intervals. Thus, all employees who survived to the end of or who terminated their employment during the first two-month seniority interval provided useful data about the first two months of employment, regardless of the date each person was hired. All employees who survived the first two-month seniority interval provided useful data for the second two-month seniority interval, and so forth. Data on people who are still employed at the end of an observation period are defined as censored (Peters & Sheridan, 1988). Although censored data are problematic in many research designs, survival analysis incorporates them in a way that does not systematically distort an estimated underlying tenure distribution (Berkson & Gage, 1950). Thus, survival analysis uses all available data, both censored and uncensored, in examining underlying tenure distributions of new hires.

RESULTS

Table 1 shows means and standard deviations for all variables and correlations involving the prediction of the three perceptual states and behavioral commitment. The observed coefficients supported the prediction that behavioral commitment is related to volition, revocability, and publicness. All three perceptual states were significantly associated ($p < .01$) with behavioral commitment; for revocability the value of r was $-.54$; for publicness, it was $.19$; and for volition, it was $.36$. These results are stronger in both significance level and magnitude than those O'Reilly and Caldwell reported.

Generally supportive but weaker relationships emerged between the three perceptual states and their hypothesized situational and individual difference precursors. As predicted, perceived volition was significantly related to the perceived amount of job information ($r = .17$, $p < .01$), accuracy of that information ($r = .19$, $p < .01$), and attractiveness of the next best offer ($r = .13$, $p < .05$). The number of job offers received was not related to perceived volition. Perceived revocability was significantly related to attitude toward job change ($r = .17$, $p < .01$). Finally, perceived publicness was significantly greater for respondents who had informed a greater proportion of their significant others of their job choice than other respondents had ($r = .46$, $p < .01$) and for those who reported having more friends and relatives working at the same store than others had ($r = .10$, $p < .05$).

In order to implement the nonparametric survival procedures, we

TABLE 1
Means, Standard Deviations, and Correlations

Variables	Means	s.d.	Correlations									
			1	2	3	4	5	6	7	8	9	10
1. Number of job offers	1.51	1.42										
2. Attractiveness of next best job offer	3.53	1.79	.03									
3. Amount of job information	4.04	1.79	.04	.21**								
4. Accuracy of job information	5.09	1.54	-.02	.16*	.55**							
5. Attitude toward job change	10.76	2.94	-.01	-.18**	-.15**	.12*						
6. Proportion of significant others who know of job acceptance	0.68	0.31	-.02	.02	.03	-.08	-.04					
7. Number of friends and relatives at the same store location	1.07	4.30	-.12*	-.10	.04	.00	.00	.03				
8. Volition	22.00	2.80	.03	.13*	.17**	.19**	-.11*	.17**	.03			
9. Revocability	6.96	2.83	.03	-.02	-.13*	-.11*	.17**	-.12*	-.06	-.50**		
10. Publicness	12.84	2.05	.01	-.01	.02	-.01	-.10*	.46**	.10*	.35**	-.25**	
11. Behavioral commitment	9.94	2.42	.00	-.10*	.16**	.17**	-.20**	.15**	.04	.36**	-.54**	.19**

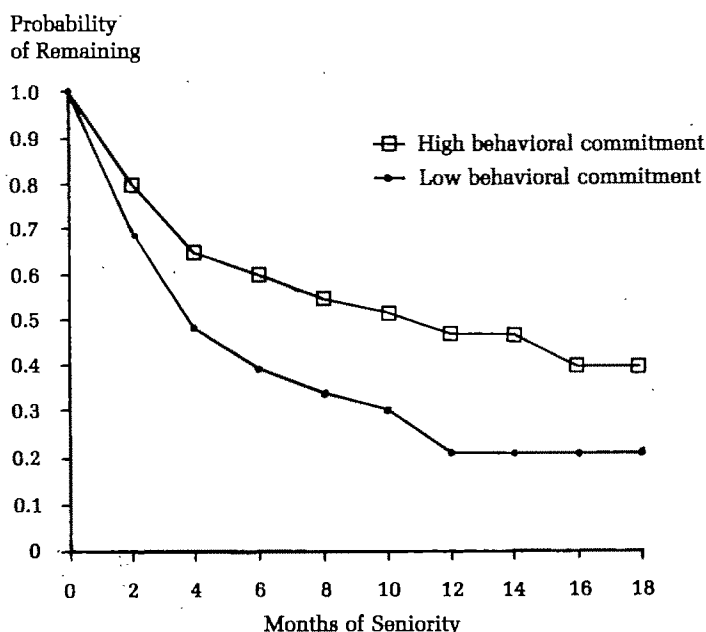
* $p < .05$ ** $p < .01$

grouped the data on tenure into nine consecutive two-month seniority intervals and calculated cumulative survival distributions using actuarial procedures developed by Berkson and Gage (1950). We then compared survival distributions across groups reflecting high and low levels of behavioral commitment and created by a median split.

Figure 1 depicts the cumulative survival rates for the employees in the high and low behavioral commitment groups. As predicted, and consistent with O'Reilly and Caldwell's results, new employees with high levels of behavioral commitment stayed significantly ($\chi^2 = 13.61$, $df = 1$, $p < .001$) and considerably longer than new employees with low levels of behavioral commitment. The difference between tenure distributions is evident as early as the beginning of the second month of employment, and the difference remains relatively constant throughout the study period. The median tenure for the high commitment group (half-life = 10.8 months) was almost three times longer than the median tenure for the low commitment group (half-life = 3.8 months)! Such differences suggest that behavioral commitment has a practical as well as a statistically significant impact.

Taken together, the present findings suggest the viability of an expanded model of behavioral commitment in which the situational and individual difference precursor variables affect their corresponding psychological states, which in turn affect behavioral commitment, which, finally, affects employee tenure. We used causal modeling procedures to conduct

FIGURE 1
Survival Analysis



follow-up analyses aimed at examining the causal linkages this model implies. Those results generally supported the direction of causality the expanded model suggests. Specifically, we computed a residual gain score in which the variance in tenure due to behavioral commitment was held constant and regressed the resulting residualized tenure variable on the three perceptual states. Only revocability continued to show a significant relationship ($p < .001$). Likewise, the set of precursor variables could not significantly explain residual variance in behavioral commitment once we controlled for volition, revocability, and publicness.

DISCUSSION

Perhaps the most striking results from this study were those involving the survival rates of the high and low behavioral commitment groups. The finding that newly hired employees entering the organization with high behavioral commitment stayed nearly three times longer than those with low behavioral commitment suggests the practical importance of behavioral commitment and points to the possible financial savings firms able to affect the behavioral commitment levels of new employees could realize.

Although all three perceptual states were significantly correlated with behavioral commitment in the present research, the strongest relationship involved perceived revocability. This is consistent with O'Reilly and Caldwell's finding. Extending O'Reilly and Caldwell's work, we found correlational results involving individual and situational precursors to these three perceptual states that were, with one exception, consistently supportive of the earlier findings. This is the first study to specifically identify factors that appear to determine key perceptual states of volition, revocability, and publicness in an organizational context.

The present findings suggest that an expanded model of the behavioral commitment process should contain relevant precursor variables. Our results not only underscore the theoretical integrity of such an expanded model but suggest the appropriateness of developing interventions based on that model.

Although they support our hypotheses, these data speak only to factors that affect early job withdrawal. They do not address employees' later psychological attachment to an organization—organizational commitment *per se*—nor do they address long-term turnover processes. Without doubt, turnover among longer-tenured employees would tend to reflect their current evaluations of their jobs and organizational conditions (e.g., Porter, Crampon, & Smith, 1976). The linkage between newcomers' characteristics and experiences and later organizational commitment and turnover therefore appears to be a useful avenue for future research.

Data from a recent study by Lee, Ashford, Walsh, and Mowday (1990) underscore this point. Their results indicated that newcomers who entered an organization with high levels of "commitment propensity," a construct including behavioral commitment as a component, subsequently developed

and maintained higher levels of organizational commitment than other newcomers. Those with high initial organizational commitment were also less likely to leave than those with low initial organizational commitment. Importantly, newcomers' behavioral commitment was related to later evaluation and interpretation of the same situational stimuli, suggesting that commitment propensity affects new employees' sense making as well as their initial organizational commitment and early withdrawal decisions.

Taken together with Lee and colleagues' findings, the present results suggest that behavioral commitment and other contributors to commitment propensity might act as a bridge between initial organizational contact and later organizational experience. Employees with high behavioral commitment may not only stay longer than their low behavioral commitment counterparts but be predisposed to interpret and evaluate their organizational experiences more positively. In this manner, behavioral commitment would not only affect early termination decisions but also contribute to later employee adjustment for those who survive the initial months of employment. Additional research is needed to sort out the role of commitment propensity factors such as behavioral commitment on the long-term organizational commitment and termination decisions of those who survive their initial employment period.

The present results suggest that new employees do arrive on their first day of employment with measurable differences in their commitment to their job choice. These findings emerged in the absence of a systematic organizational intervention designed to influence the perceptual states measured and, therefore, behavioral commitment. Thus, our findings do not shed light on whether behavioral commitment and early job termination can be managed during the job decision process. These findings suggest that interventions aimed at managing behavioral commitment and early withdrawal should involve an assessment of relevant individual differences and conscious efforts to control key contextual precursor variables. Research aimed at evaluating intervention programs based on these suggested partial determinants of behavioral commitment would help sort out the real impact of the behavioral commitment process on early job tenure and the ability to manage it.

REFERENCES

- Berkson, J., & Gage, R. 1950. Calculation of survival rates for cancer. *Staff Meeting of the Mayo Clinic*: 270-286.
- Brehm, J. W. 1956. Postdecision changes in the desirability of alternatives. *Journal of Abnormal and Social Psychology*, 52: 384-389.
- Festinger, L. 1957. *A theory of cognitive dissonance*. Stanford, CA: Stanford University Press.
- Ilgen, D. R. 1975. *The psychological impact of realistic job previews*. Technical report no. 2, Purdue University, West Lafayette, IN.
- Lee, T. W., Ashford, S. J., Walsh, J. P., & Mowday, R. T. 1990. *Commitment propensity, orga-*

- nizational commitment, and voluntary turnover: A longitudinal study of organizational entry processes.** Working paper, School of Business Administration, University of Washington, Seattle.
- Lee, E. T., & Desu, M. M. 1972. A computer program for comparing K samples with right-censored data. *Computer Programs in Biomedicine*, 2: 315-321.
- Morita, J. G., Lee, T. W., & Mowday, R. T. 1989. Introducing survival analysis to organizational researchers: A selected application to turnover research. *Journal of Applied Psychology*, 74: 280-292.
- Mowday, R. T., & McDade, T. W. 1979. *Linking behavioral and attitudinal commitment: A longitudinal analysis of job choice and job attitudes.* Paper presented at the annual meeting of the Academy of Management, Atlanta.
- Mowday, R. T., Steers, R. M., & Porter, L. W. 1979. The measurement of organizational commitment. *Journal of Vocational Behavior*, 14: 224-247.
- O'Reilly, C. A., & Caldwell, D. F. 1981. The commitment and job tenure of new employees: Some evidence of postdecisional justification. *Administrative Science Quarterly*, 26: 597-616.
- Peters, L. H., & Sheridan, J. E. 1988. Turnover research methodology: A critique of traditional designs and a suggested survival model alternative. In G. Ferris & K. Rowland (Eds.), *Research in Personnel and Human Resources Management*, vol. 6: 231-262. Greenwich, CT: JAI Press.
- Porter, L. W., Crampon, W. J., & Smith, F. L. 1976. Organizational commitment and managerial turnover: A longitudinal study. *Organizational Behavior and Human Performance*, 15: 87-98.
- Salancik, G. R. 1977a. Commitment and the control of organizational behavior and belief. In B. M. Staw & G. R. Salancik (Eds.), *New directions in organizational behavior*: 1-54. Chicago: St. Clair Press.
- Salancik, G. R. 1977b. Commitment is too easy! *Organizational Dynamics*, 5: 62-80.
- Staw, B. M. 1977. *Two sides of commitment.* Paper presented at the annual meeting of the Academy of Management, Atlanta.
- Stevens, J. M., Beyer, J. M., & Trice, H. M. 1978. Assessing personal, role, and organizational predictors of managerial commitment. *Academy of Management Journal*, 21: 380-396.

Cathy J. Kline received her Ph.D. degree in management from the University of Texas at Dallas. She is currently an adjunct professor of management at Saint Leo College. Her current interests include commitment processes, work motivation, and turnover.

Lawrence H. Peters is a professor of management with the M. J. Neeley School of Business at Texas Christian University. He received his Ph.D. degree in industrial/organizational psychology from Purdue University. His current research interests include commitment processes, social cognition interventions on appraisal processes, and survival analysis implications for employee turnover.

EFFECTS OF BOARD AND OWNERSHIP STRUCTURE ON CORPORATE R&D STRATEGY

BARRY D. BAYSINGER

Texas A&M University

RITA D. KOSNIK

Trinity University

THOMAS A. TURK

Texas A&M University

This study examined the extent to which the percentage of outside directors on a corporation's board of directors, the concentration of equity ownership, and the roles of individual and institutional stockholders influence the company's R&D strategy. We found that high insider representation on a board and a concentration of equity among institutional investors positively affected corporate R&D spending.

The separation of ownership and control in large publicly owned firms has induced potential conflicts between the interests of professional managers and stockholders (Berle & Means, 1932; Marris, 1964). Stockholders are interested in maximizing the long-term profitability of a firm and the value of their investments, but managers' objectives when running a company's business may also include assuring personal wealth, job security, and prestige. This divergence of managers' and stockholders' objectives may lead to acute conflicts of interest in decisions regarding the strategic orientation of the firm.

One strategic decision that is subject to acute manager-stockholder conflicts of interest is a firm's corporate R&D strategy. High investment in R&D is generally a high risk–high return strategy that is attractive to stockholders because they anticipate a positive effect on performance and they can reduce the inherent risk by keeping diversified investment portfolios (Hay & Morris, 1979). In contrast, executives will be reluctant to invest in long-term R&D projects because innovative projects have high failure rates (Mansfield, 1968) and do not yield short-term returns. Since the prolongation of top managers' incumbent control positions and their wealth are typically tied to a firm's performance, risky R&D projects imply an immediate employment risk (Alchian & Demsetz, 1972) that, unlike the stockholders' financial risk, cannot be diversified away. To the extent that a company's control and

This is an equally coauthored article. We thank Robert Hoskisson and this journal's anonymous reviewers for their helpful comments on earlier versions.

evaluation system emphasizes financial performance criteria such as return on investment, managers will prefer projects that yield measurable short-term returns over long-term innovation projects that reduce the net returns on the current balance sheet (Baysinger & Hoskisson, 1989). Analysts have therefore expected managers' alleged interests in short-time horizons and risk reduction to condition their R&D strategies (Lambert & Larcker, 1985). However, three critical actors in a company's governance system may influence management's discretion to choose to avoid risky R&D strategies: large individual shareholders, institutional investors, and the board of directors.

Given their large stake in a company's equity, large stockholders have an obvious incentive to monitor top management's decisions closely in order to promote the firm's long-term performance (Alchian & Demsetz, 1972). Cubbin and Leech (1983) indeed found that large stockholders had considerably more power over management than small stockholders. Hill and Snell (1988) reported a significant, positive relationship between the level of corporate R&D spending in 94 large research-intensive companies and the concentration of equity ownership among individual stockholders, suggesting that large stockholders can encourage corporate investment in R&D.

As the legal representative of corporate stockholders, a board's independent outside directors are expected to help promote strategic orientations that benefit stockholders' wealth, including investment in R&D (Kosnik, 1987, 1990). However, Hill and Snell (1988) found that a high level of inside—not outside—directors positively affected corporate R&D spending. That result is intuitively puzzling and inconsistent with the guardian role that both corporate law and agency theory ascribe to outside board members (Jensen & Meckling, 1976).

Institutional investors, the third group of actors in corporate governance, are frequently charged with promoting managerial risk-aversiveness because institutional money managers emphasize short-term gains when managing investment portfolios (Drucker, 1986; Graves & Waddock, 1990; Woolridge, 1988). Researchers attribute institutional managers' pursuit of short-term returns to the fact that their rewards are based on quarterly or annual results. Institutional investors derive their power over top managers from the mere size of their equity holdings: heavy institutional selling can cause drastic declines in a firm's market value. In a trend analysis of 22 computer manufacturing firms, Graves (1988) illustrated the purported detrimental effect of institutional stock ownership on corporate R&D spending. However, an earlier study by Jarrell, Lehn, and Marr (1985) using across-industry data showed a positive relationship between R&D spending and institutional ownership.

The purpose of the present study was to reevaluate and extend the studies by Hill and Snell, Graves, and Jarrell and colleagues by examining the combined effects of board composition and equity concentration among both individual and institutional investors on corporate R&D spending. Three specific research objectives motivated the study. First, in order to assess whether the interests of institutional investors indeed deviated from

those of individual investors, we needed to compare their respective effects on corporate R&D spending for the same set of companies under the same conditions. Second, in order to accurately evaluate the effects of stockholders and board members on corporate R&D spending across companies, it seemed critical to control for other firm-specific determinants of corporate R&D intensity. Jarrell and colleagues included no such firm-level factors, Hill and Snell only controlled for firm size, and Graves controlled for market share and profit. Third, in contrast to the latter two studies, which both included only research-intensive companies, this study used a multi-industry group in order to increase the variance in the dependent variable. We included industry-specific control variables to account for industry-level variance.

METHODS

Data

The data used in this study concern 176 Fortune 500 companies. We selected the companies from the Fortune 500 list on the basis of the availability of data on the companies' corporate governance structures, R&D spending levels, and the covariates of interest. A descriptive analysis of the governance variables and covariates for the final group of companies revealed it was highly representative of the global pool of Fortune 500 firms.

Dependent and Independent Variables

Corporate R&D spending per employee, averaged over the period 1981–83, served as the dependent variable; the data were recorded from Standard and Poor's COMPUSTAT tapes. Previous research has found R&D spending per employee to be more stable and less sensitive to the spurious effects of business cycles, accounting manipulations, and asset sales than R&D spending as a proportion of sales (Scherer, 1984). Both Hill and Snell (1988) and Graves (1988) used R&D spending per employee as their measure.

The study's independent variables were levels of stock concentration among individual and institutional investors and the percentage of insiders on the companies' boards of directors. We compiled data on the percentage of inside directors from form 10-K filings with the Securities and Exchange Commission, annual reports, and the biographical section of the *Dunn and Bradstreet Reference Book of Corporate Managements*. Data on the concentration of stock among shareholders were recorded from the 1981 Corporate Data Exchange Stock Ownership Directory: *Fortune 500*, which reports the percentage of stock owned by all publicly identifiable stockholders, both individuals and institutions, who owned 0.2 percent or more of a corporation's common voting stock in 1980. The fact that this comprehensive report was only published for 1980 precluded our conducting a longitudinal analysis. Instead, we examined a lagged relationship between ownership concentration in 1980 and average corporate R&D spending from 1981 through

1983.¹ We measured ownership concentration as the cumulative percentage of equity held by shareholders with ownership positions of 0.2 percent or more. We also computed a logarithmic transformation of a Herfindahl measure of stock concentration,²

$$\ln \sum_{i=1}^n S_i^2,$$

where S_i is the percentage of equity owned by the i th stockholder and n is the number of stockholders who owned 0.2 percent or more of a firm. The cumulative concentration measure weights the effects of all major stockholders equally, but the Herfindahl measure does not; it allowed us to incorporate the number of stockholders as well as the differences in the sizes of their holdings, giving very large ownership positions more weight than smaller positions (Hay & Morris, 1979). This extra dimension is important in view of Cubbin and Leech's (1983) finding that the relationship between stockholders' power over management and the sizes of their equity positions is nonlinear.

Covariates

We controlled for average industry R&D intensity, diversification, and firm size. We measured industry R&D intensity as a weighted average of industry R&D spending in all industries in which a firm operated, or

$$\sum_{j=1}^n P_{ij}RD_j,$$

where RD_j is R&D spending relative to the sales of industry j , P_{ij} is the percentage of firm i 's total sales in industry j , and n is the number of different industries in which firm i operates. We defined industries by Standard Industrial Classification (SIC) codes at the two-digit level.

At the firm level, a company's degree of unrelated diversification negatively affects its R&D spending (Baysinger & Hoskisson, 1989), and its size positively affects R&D spending (Hill & Snell, 1988). We measured firm size by dollar sales, obtaining data from the general COMPUSTAT tapes. We used the entropy measure of diversification (Jacquemin & Berry, 1979), defined as $\sum P_i \ln (1/P_i)$, where P_i is the dollar value of sales attributed to

¹ Separate analyses were also conducted for average R&D spending in 1981, 1982, and 1983; the results for these individual analyses were not significantly different from the results reported here for a three-year average.

² The Herfindahl index is commonly used in the industrial organization economics literature to measure industry concentration. In that context, it is the sum of the squared market shares of industry participants. The value declines with increases in the number of firms and increases with rising inequality among the shares of any given number of firms.

segment i and $\ln(1/P_i)$ is the logarithm of the inverse of its sales. We calculated this entropy measure separately for related and unrelated diversification, examining all four-digit SIC industry segments in single two-digit SIC industry groups for the former and examining between-industry groups for the latter. Data on the dollar value of sales associated with a company's individual segments were obtained from Standard and Poor's COMPUSTAT segment files.

ANALYSIS AND RESULTS

Table 1 reports the means, standard deviations, and Pearson product-moment correlations among the variables used in the analysis. Intercorrelations among the full set of predictor variables were sufficiently low to preclude the generation of unstable beta coefficients in regression analysis. The descriptive statistics reported in Table 1 are consistent with those Demsetz and Lehn (1985) presented for the entire *Fortune* 500.

Table 2 presents the results of simple linear regression analyses. In the first regression model, we measured ownership concentration as the cumulative percentage of equity owned by all shareholders owning 0.2 percent or more of a firm's outstanding stock. In the second model, we measured ownership concentration among all stockholders by the Herfindahl measure given above. The third model measured ownership concentration separately for individual and institutional investors.

The results shown in Table 2 indicate that the percentage of inside directors on a board was positively related to R&D spending in all three models ($p < .01$). The effect of ownership concentration, however, was mixed. Ownership concentration positively affected corporate R&D spending per employee when measured as the cumulative equity owned by major shareholders ($p < .05$). However, with the Herfindahl measure, no significant relationship with R&D spending emerged (model 2). The results of model 3 suggest that the concentration of stock among institutional stockholders positively affected R&D spending ($p < .05$) but that ownership concentration among individual shareholders did not affect it.

DISCUSSION

The results of this study indicate that with industry and firm-specific effects induced by size and diversification controlled, the proportion of inside directors serving on a board of directors and the role of institutional investors in a firm's ownership structure positively affect the corporate R&D spending of large firms. Hence, the present results give credence to the notion that actors in a company's governance structure can influence critical strategic variables.

The positive effect of management's presence on a board on R&D spending is consistent with the findings of Hill and Snell (1988) but raises questions about the inherent risk aversiveness and short-term orientation often attributed to top executives. Although there is anecdotal evidence support-

TABLE 1
Means, Standard Deviations, and Pearson Product-Moment Correlations^a

Variables	Means	s.d.	Correlations								
			1	2	3	4	5	6	7	8	9
1. Average R&D spending	2,554.21	1,989.02									
2. Industry R&D spending	2.09	1.28	.52**								
3. Sales in millions	4,243.31	7,827.01	.21**	-.04							
4. Related diversification	0.72	0.45	-.06	-.07	-.14**						
5. Unrelated diversification	0.83	0.51	-.12†	-.12†	.06	-.34**					
6. Percentage of inside directors	40.50	16.90	.26**	.11†	.03	-.07	-.13*				
7. Ownership concentration, cumulative measure	51.10	16.16	.22**	.13*	-.16*	-.02	-.17**	.14*			
8. Ownership concentration, Herfindahl measure	5.20	1.27	-.03	-.12†	-.16*	-.02	-.17**	.05	.69**		
9. Individual ownership concentration	10.38	13.14	-.02	-.07	-.11†	.11†	-.16*	.05	.50**	.63**	
10. Institutional ownership concentration	36.70	15.02	.25**	.23**	-.11†	-.04	-.04	.16*	.61**	.08	-.28**

^aN = 176.

† $p < .10$

* $p < .05$

** $p < .01$

TABLE 2
Results of Linear Regression Analyses^a

Independent Variables	Model 1		Model 2		Model 3	
	β	<i>t</i>	β	<i>t</i>	β	<i>t</i>
Industry R&D spending	.488	7.941**	.509	8.077**	.479	7.568**
Sales	.252	4.090**	.234	3.733**	.249	3.984**
Related diversification	.019	0.297	.011	0.170	.016	0.240
Unrelated diversification	-.011	-0.171	-.027	-0.391	-.025	-0.368
Percentage of inside directors	.193	3.107**	.212	3.397**	.189	3.002**
Ownership concentration, cumulative measure	.157	2.493*				
Ownership concentration, Herfindahl measure			.047	0.734		
Individual ownership concentration					.064	.962
Institutional ownership concentration					.143	2.143*
R ²	.39		.37		.39	
F	18.22**		16.71**		15.18**	

^a N = 176.

† *p* < .10

* *p* < .05

** *p* < .01

ing those allegations (cf. Woolridge, 1988), top management's conservatism might not be as intrinsic a trait as many have claimed. Rather, observers might have lost sight of certain conditions that could induce the observed conservatism. For instance, Hayes and Abernathy (1980) and Baysinger and Hoskisson (1989) argued that a company's emphasis on objective financial controls rather than strategic controls in the evaluation of management's performance encourages management to prefer strategies with short-term payoffs over long-term R&D projects. If top executives are routinely penalized for implementing strategies that perform poorly regardless of the strategies' ex ante attractiveness or justification, executives will be reluctant to invest in risky R&D strategies. Since it is board members who are responsible for evaluating and rewarding executives' performance, the relationships among the composition and functioning of a board, a company's evaluation systems, and its strategic orientation emerge as an important topic for future research. Our results suggest that top executives may be more willing to invest in risky R&D projects if they are well-represented on a board and therefore less dependent on the judgment and evaluation of outside directors.

Hill and Snell (1988) reported a positive relation between stock ownership concentration and R&D spending; they did not distinguish between individual and institutional owners. Our findings suggest that the positive effect of stock concentration on R&D spending can be attributed mainly to

the impact of institutional rather than individual investors. The role of institutional investors also accounts for the fact that we found a positive effect only for the cumulative measure of stock concentration and not for the Herfindahl index of ownership concentration. In contrast to the cumulative measure, which weights the effects of all stockholders equally, the Herfindahl measure assigns a larger weight to the largest shareholders; the *Corporate Data Exchange* report suggests that those very large shareholders are typically individuals rather than institutions. Hence, although previous studies have used different measures of ownership concentration interchangeably (Demsetz & Lehn, 1985; Hill & Snell, 1988), the current findings indicate that it is critical to carefully assess the relative impacts of the measures used in the context of an analysis.

The observed positive effect of equity concentration among institutional investors on corporate R&D spending sharply contrasts with the popular claim that their shortsightedness forces top executives to adopt a short-term focus when making investment decisions (Graves & Waddock, 1990). Our results suggest that institutional stockholders positively value capital investments in long-term R&D projects. This observation is consistent with the finding that firms announcing an increase in R&D expenditures experience an upturn in their market value (Jarrell et al., 1985). R&D strategies are risky and may induce a high level of variance in a firm's future returns. Institutional investors, whose investment portfolios are typically diversified, may be able to spread R&D risk more effectively than individual investors with undiversified or smaller investment portfolios. The absence of a systematic relationship between R&D spending and ownership concentration among individual stockholders may be due to the heterogeneity of individual investors. Large diversified individual stockholders may prefer the higher returns of risky R&D strategies, but very risk-averse or undiversified individual stockholders are more likely to opt for lower-risk strategies with low-variance returns.

The observed positive relationship between corporate R&D spending and equity ownership by institutional investors is consistent with the findings of Jarrell and colleagues (1985) and Hill and Hansen (1989) but inconsistent with the negative contemporaneous effect Graves (1988) reported for a sample of computer firms. Within the computer industry, the average level of corporate R&D spending as well as the average level of institutional ownership exceed the average levels of R&D spending and institutional ownership across industries (Graves, 1988; Hill & Snell, 1988). It is possible that restricting a sample to the computer industry creates a systematic distortion. However, the designs of this and previous studies do not allow a direct assessment of the direction of causality between institutional stock ownership and R&D spending. One interpretation of the current findings is that the prospect of high financial returns attracts institutional investors to companies that engage in long-term R&D strategies, and the investment risk does not deter these investors because they can diversify it away. The alternative interpretation is that institutional investors who own large stakes in a com-

pany's stock are less able to move efficiently in and out of stock positions (Business Week, 1987, 1990). Hence, they try to influence the return of their investment by becoming actively involved in a company's management, for instance, by promoting R&D strategies with favorable prospects for positive returns. Extended longitudinal studies and field studies are needed to examine whether institutions try to influence management or merely migrate to firms with strategies consistent with their preferences.

We did not find a significant relationship between diversification and R&D spending, in contrast to previous studies (Baysinger & Hoskisson, 1989; Hoskisson & Hitt, 1988) that have reported a negative relationship between unrelated diversification and R&D spending. Those studies, however, did not include measures of board composition or stock concentration. Our results seem to suggest that the observed relationship between the strategies of diversification and R&D may be spurious and driven by a company's governance structure, or the relative influence of its board and stockholders. This interpretation is consistent with Hill and Snell's (1988) finding that overall diversification is negatively related to insider representation on a board and stock concentration.

In sum, despite the current intense debate on the roles of institutional investors and outside directors, it is clear that our systematic knowledge about their impact on strategic management and financial markets is still very limited. It seems imperative to analyze their roles more closely to improve understanding of the process and performance effects of corporate governance.

REFERENCES

- Alchian, A. A., & Demsetz, H. 1972. Production, information costs, and economic organization. *American Economic Review*, 62: 777-795.
- Baysinger, B. D., & Hoskisson, R. E. 1989. Diversification strategy and R&D intensity in multi-product firms. *Academy of Management Journal*, 32: 310-332.
- Berle, A. A., Jr., & Means, G. C. 1932. *The modern corporation and private property*. New York: Macmillan.
- Business Week*. 1987. The battle for corporate control. May 18: 102-109.
- Business Week*. 1990. What's ahead at the annual meetings. February 26: 8.
- Cubbin, J., & Leech, D. 1983. The effect of shareholder dispersion on the degree of control in British companies: Theory and measurement. *Economic Journal*, 93: 351-369.
- Demsetz, H., & Lehn, K. 1985. The structure of corporate ownership: Causes and consequences. *Journal of Political Economy*, 93: 11-55.
- Drucker, P. F. 1986. A crisis of capitalism. *Wall Street Journal*, September 30: 25-26.
- Graves, S. A., & Waddock, S. A. 1990. Institutional ownership and control: Implications for long-term corporate strategy. *Academy of Management Executive*, 4: 75-83.
- Graves, S. B. 1988. Institutional ownership and corporate R&D in the computer industry. *Academy of Management Journal*, 31: 417-427.
- Hay, D. A., & Morris, D. J. 1979. *Industrial economics: Theory and evidence*. Oxford, U.K.: Oxford University Press.

- Hayes, R. H., & Abernathy, W. J. 1980. Managing our way to economic decline. *Harvard Business Review*, 58(4): 67–77.
- Hill, C. W. L., & Hansen, G. S. 1989. Institutional holdings and corporate R&D intensity in research intensive industries. *Academy of Management Best Paper Proceedings*: 17–21.
- Hill, C. W. L., & Snell, S. A. 1988. External control, corporate strategy, and firm performance in research-intensive industries. *Strategic Management Journal*, 9: 577–590.
- Hoskisson, R. E., & Hitt, M. A. 1988. Strategic control systems and relative R&D investment in large multiproduct firms. *Strategic Management Journal*, 9: 605–621.
- Jacquemin, A. P., & Berry, C. H. 1979. Entropy measure of diversification and corporate growth. *Journal of Industrial Economics*, 27: 359–369.
- Jarrell, G. A., Lehn, K., & Marr, W. 1985. *Institutional ownership, tender offers and long-term investments*. Working paper, Office of the Chief Economist, Securities and Exchange Commission, Washington, DC.
- Jensen, M., & Meckling, W. 1976. Theory of the firm: Managerial behavior, agency costs, and ownership structure. *Journal of Financial Economics*, 3: 305–360.
- Kosnik, R. D. 1987. Greenmail: A study of board performance in corporate governance. *Administrative Science Quarterly*, 32: 163–185.
- Kosnik, R. D. 1990. Effects of board demography and directors' incentives on corporate greenmail decisions. *Academy of Management Journal*, 33: 129–150.
- Lambert, R. A., & Larcker, D. F. 1985. Executive compensation, corporate decision-making and shareholder wealth: A review of the evidence. *Midland Corporate Finance Journal*, 2: 6–22.
- Mansfield, E. 1968. *Industrial research and technological innovation*. New York: Norton.
- Morris, R. 1964. *The economic theory of managerial capitalism*. London: MacMillan.
- Scherer, F. M. 1984. *Innovation and growth: Schumpeterian perspectives*. Cambridge, MA: MIT Press.
- Woolridge, J. R. 1988. Competitive decline: Is a myopic stock market to blame? *Journal of Applied Corporate Finance*, 1: 26–36.

Barry Baysinger is an associate professor of management in the College of Business Administration at Texas A&M University. He received his Ph.D. degree in economics from the Virginia Polytechnic Institute and State University. His research interests include organizational economics, strategy implementation, and organizational design.

Rita D. Kosnik is an assistant professor of management at Trinity University. She received her Ph.D. degree from Northwestern University. Her current research interests include boards of directors, corporate governance, and mergers and acquisitions.

Thomas A. Turk is an assistant professor of management at Texas A&M University. He received his Ph.D. degree in strategic management from the University of California, Irvine. His current research interests include corporate strategy, corporate governance, and mergers and acquisitions.

PROSPECT THEORY AND THE RISK-RETURN RELATION: SOME BELGIAN EVIDENCE

MARC JEGERS
Free University of Brussels

In this study, Fiegenbaum and Thomas's application of prospect theory to empirically derived risk-return relations was replicated and extended with Belgian accounting data. Four profitability variables and two risk variables figured in the analysis. Findings confirmed the results of the earlier study: firms with returns above a target level are risk-averse, and firms with returns below that target level are risk-seeking.

According to conventional economic wisdom, the level of risk a firm assumes and its returns are positively correlated, which implies that firms are risk-averse irrespective of their returns. Nevertheless, a comprehensive review of the empirical literature by Fiegenbaum and Thomas (1988: 86–88) revealed that this relationship does not always hold. Researchers have found negative correlations between risk and return in most industries. Of particular interest are Bowman's (1980) findings, the basis of his so-called risk-return paradox. In a subsequent article, Bowman (1982) proposed a possible explanation for the negative correlation observed, stating that "troubled companies take more risk." The results of a content analysis of the annual reports of a small number of firms agreed with Bowman's statement. As he noted (1982: 35), the notion of risk seeking fits in very well with recently developed behavioral decision theories stressing the role of reference in the analysis of risky choices. Kahneman and Tversky's (1979) prospect theory—according to which, risk attitudes are not determined by the level of the outcome, but by the outcome's relation to some reference point—seems especially promising in this respect. By relaxing the traditional expectation principle—which states that the overall utility of a prospect is the expected utility of its outcomes—and defining utility on a profit-loss basis, they were able to derive testable hypotheses concerning a firm's behavior vis-à-vis risk: when performance is below a given target level, decision makers are risk-seeking, and when performance is above the target level, they are risk-averse. In the present research, I defined the target level as the median return for the firms in an industry.

In terms of the risk-return relation, these predictions mean that in a

Constructive remarks made on previous versions by two anonymous referees for this journal and by Professor Diana Phillips are gratefully acknowledged.

group of firms with above-target returns, risk and return should be positively correlated, and that in a group of firms with below-target returns, they should be negatively correlated. The predictions also imply that empirical risk-return studies based on a group composed of both above-target and below-target firms suffer from a misspecification bias (Fiegenbaum & Thomas, 1988: 90). The effect of such misspecification on the risk-return relation at an industry level is indefinite: empirical analysis can yield both positive and negative risk-return correlations in a situation that fits prospect theory's assumptions. The Appendix discusses this problem in detail.

Fiegenbaum and Thomas (1988) tested the predictions of prospect theory using accounting data. Within industries, they divided firms into two groups, those with above-target returns and those with below-target returns. They defined an industry's median return as the target, which implied that, for each industry, both groups contained an equal number of firms. Analysis of the association between risk and return in the two groups strongly corroborated the prospect theory predictions, and the same result emerged when Fiegenbaum and Thomas applied this research procedure to the entire data set across industries.

In the present research, I replicated Fiegenbaum and Thomas's (1988) methodology using Belgian accounting data. Furthermore, to see whether their results were robust, I also examined risk and return variables they did not use. Their return variable was the accounting-based rate of return on equity (ROE), which reflects a shareholder point of view, as only the earnings available to the owners of a firm are taken into consideration. It is arguable that a management point of view is more relevant when managers have a decisive influence on strategic decision making. Managerial performance can be measured by the accounting-based rate of return on total assets (ROA), a measure that accounts for all the earnings of a firm before distribution to creditors and owners.

The concept of an accounting-based rate of return has come under severe attack as it is a bad estimator of the economic (internal) rate of return (Fisher & McGowan, 1983). Salamon (1985) provided a possible partial refutation of that attack and suggested the use of cash-flow-based rates of return. Consequently, in addition to accounting-based measures of ROE and ROA, I considered cash flow on equity and cash flow plus financial outlays on total assets as measures of returns.

To measure risk, Fiegenbaum and Thomas (1988) used variance of returns, an absolute measure. As there is no a priori reason why that should be the only way risk is measured, I proposed to study a relative variability measure as well, choosing the coefficient of variation, defined as the standard deviation of returns divided by the average return. For a comprehensive treatment of risk measurement, readers may consult Miller and Bromiley (1990), in which nine measures of risk are considered in a risk-return context.

Risk and return measures based on order statistics (medians and interquartile ranges) were also studied in this research, but lack of space prohibits

presenting results here. Those results were in full agreement with those reported in the present article; details are available from the author.

METHODS

Data

Belgium is one of the smaller founding members of the European Economic Community (EEC). The Commission of the EEC has some power to coordinate the economic legislation of each member state in order to unify the EEC's internal competitive environment. One field in which the Commission has had a substantial impact is that of disclosure of firms' financial information. A mandate called the 4th EEC directive on the disclosure of financial statements, which has been incorporated into Belgian law, makes available to both practitioners and researchers the financial statements of about 20,000 firms from 1977 onwards.¹ By law, these financial statements have a uniform structure and are collected by the Belgian National Bank after proper auditing. The bank, a regulated company with powers comparable to those of the federal reserve system in the United States, makes the statements available to the public on magnetic tape. In principle, these data cover all large and medium-sized Belgian firms, with a medium-sized firm defined as a firm exceeding one of three limits: 50 employees, sales of \$1.2 million in U.S. dollars, or \$.6 million in total assets (in U.S. dollars). Because these limits are low, the size distribution of the population of firms is highly skewed, with small firms greatly outnumbering large ones. The data base used in the research reported here consisted of all 3,250 financial statements of Belgian manufacturing firms, available on tape for the years 1977–82. I excluded companies engaged in building and civil engineering. In 1979, these 3,250 firms realized more than 80 percent of all sales by Belgian manufacturing firms.

The aggregation level at which the analysis was performed was the three-digit NACE level, derived from the industrial classification scheme EEC authorities use (Statistical Office of the European Communities, 1985). This scheme classifies economic activities "characterized by an input of products, a production process and an output of products" (Statistical Office of the European Communities, 1985: 16). The NACE and International Standard Industrial Classification schemes agree perfectly up to the two-digit level (Statistical Office of the European Communities, 1985: 8). The present research involved 110 three-digit NACE manufacturing industries.

Unfortunately, the formal quality of the data filed under the Belgian accounting legislation is not always satisfactory: many of the disclosed financial statements have errors, and some are incomplete (cf. Jegers & Buijink, 1987). A loss of observations results, as the tables reveal. Neverthe-

¹ Theunisse (1987) provides a detailed description of Belgian legislation on accounting practices.

less, previous research has shown that this loss of observations does not bias the remaining profitability distributions (Buijink & Jegers, 1986).

Measures

This research replicates the methods and measures of Fiegenbaum and Thomas (1988). However, data availability limited the analysis to one time period (1977–82), whereas Fiegenbaum and Thomas analyzed several periods in their review. The profitability measure those authors used was accounting-based ROE, and their risk measure was variance in ROE. There is no conceptual difference between accounting rates of return based on U.S. data and Belgian accounting data. I calculated each firm's average return over the six-year period, ranked the firms of each industry according to these values, and divided the firms into two equally sized groups, those with a return above target level and those with a return below target level. The target level was defined as the median industry return. For each group, I then calculated the Spearman rank correlation between return and risk and the negative association ratio, a statistic based on two-by-two contingency table (Fiegenbaum & Thomas, 1988). The four resulting cells are high return–high risk, high return–low risk, low return–high risk, and low return–low risk. The negative association ratio is defined as the number of firms in the low-high and high-low cells divided by the number of firms in the high-high and low-low cells, with a value below 1 implying a positive association between risk and return and a value above 1 implying a negative association.

The test to assess the significance of a rank correlation is very well established. For the negative association ratio, however, no standard test is available. Following Fiegenbaum and Thomas, I applied a binomial test; the null hypothesis in this case is that the probability of finding a negative association ratio below 1 is 50 percent. A binomial distribution with p set equal to .50 can be used to test the significance of the difference between the number of industries with a ratio below 1 and the number with a ratio above 1. Fiegenbaum and Thomas required at least ten observations per industry for a within-industry analysis, a standard I adopted in the present research. As did Fiegenbaum and Thomas, I conducted this analysis for the whole data set, which provided a basis for across-industry results. For this analysis, I could not apply the significance test on the negative association ratio as there was just one value for the ratio in each group.

Calculation of the three additional return variables—accounting-based ROA, cash flow on equity, and cash flow plus outlays on total assets—was straightforward and no different conceptually from U.S. practice. Table 1 shows the correlations between the return variables used in the present study; although the correlations are all significantly positive, the values of the coefficients are low enough to justify an assumption that the return variables have some independence with respect to each other.

The rank correlation between the variance of returns and the coefficient of variation in returns lies between .52 (accounting-based ROE) and .69 (cash flow plus financial outlays on total assets).

TABLE 1
Rank Correlations Between Measures

Variables	Correlations ^a			
	1	2	3	4
1. Accounting-based ROE				
2. Accounting-based ROA	.75 (1,024)			
3. Cash flow on equity	.67 (804)	.54 (781)		
4. Cash flow plus financial outlays on total assets	.61 (779)	.80 (797)	.72 (778)	

^a Figures in parentheses represent numbers of observations.

RESULTS

Table 2 presents a comparison of Fiegenbaum and Thomas's (1988) results for their within-industries analysis and those obtained with the Belgian data, and Table 3 compares the two sets of across-industries results.

Table 4 presents the results obtained by introducing the additional return and risk variables into the within-industries analysis, and Table 5 shows across-industry results with the additional variables. Tables 4 and 5 are structured like Tables 2 and 3, but to facilitate comparisons they also include the results obtained with accounting-based ROE as the only variable measuring return.

DISCUSSION

The similarity between Fiegenbaum and Thomas's results and my own is striking in both the below- and above-target-level groups and in both the

TABLE 2
Results of Comparative Risk-Return Analysis Within Industries

Variables	Fiegenbaum and Thomas	Belgian Data
Below-target firms		
Number of industries with 10 or more observations	47	38
Percentage of industries with significant, negative rank correlations	81***	50***
Percentage of industries with a negative association ratio >1	94**	95**
Above-target firms		
Number of industries with 10 or more observations	47	38
Percentage of industries with significant, positive rank correlations	57***	53***
Percentage of industries with a negative association ratio <1	75**	82**

^a This statistic is based on a binominal test with $p = .05$.

** $p < .01$

TABLE 3
Results of Comparative Risk-Return Analysis Across Industries

Variables	Fiegenbaum and Thomas	Belgian Data
Number of firms	2,394	1,066
Below-target firms		
Risk-return rank correlation	-.63**	-.64**
Negative association ratio	2.87	3.26
Above-target firms		
Risk-return rank correlation	.40**	.58**
Negative association ratio	0.60	0.42

** $p < .01$

within- and across-industries analyses. Furthermore, those results agree strongly with predictions based on prospect theory. For the firms with performance below an industry median, negative risk-return relations are predominant. The high percentage of industries in which such firms show significant, negative risk-return rank correlations or negative association ratios above 1 (Table 2) is evidence of this predominance, as are the values for those measures in the across-industries results (Table 3). The same conclusion holds for the above-target-level firms.

A first look at Tables 4 and 5 reveals that the results obtained with the accounting-based rate of return on equity as the measure of profitability (the first column in both tables) differ from those obtained using the other profitability variables. With variance of returns as the measure of risk, for both the below- and the above-target-level firms these results strongly confirm prospect theory predictions on the direction of the risk-return relation. Using the coefficient of variation as the risk variable leaves only one out of the four percentages significantly different from the value expected under the null hypothesis of a random risk-return relation in each group of firms in the within-industries analysis and dramatically reduces the correlations in the across-industries analysis. For the other return variables, a different but coherent picture emerges. In the groups of firms with returns that are below target level, all six percentages are significant at the 1 percent level when the coefficient of variation in returns is the risk variable. Using the variance of returns makes three percentages insignificant, and the significant values are never higher than the corresponding ones when the coefficient of variation is used: 30 and 46 percent; 65 and 65 percent; and 13 and 38 percent (Table 4). The across-industries analysis leads to an analogous conclusion (Table 5): the correlations are lower and the negative association ratios higher when the coefficient of variation is used to measure risk.

In the groups with above-target-level returns, the use of the variance of returns as a risk indicator produces a 1 percent significance level for all percentages. Use of the coefficient of variation reduces the number of sig-

TABLE 4
Results of Risk-Return Analysis Within Industries

Variables	Accounting-based ROE			Accounting-based ROA			Cash Flow on Equity			Cash Flow Plus Financial Outlays on Total Assets		
	Variance	Coefficient of Variation		Variance	Coefficient of Variation		Variance	Coefficient of Variation		Variance	Coefficient of Variation	
Below-target firms												
Number of industries with 10 or more observations	38	38		37	37		32	32		30	30	
Percentage of industries with significant, negative rank correlations	50**	26**		30**	46**		13*	38**		7	37**	
Percentage of industries with a negative association ratio > 1	95**	55		65**	65**		50	78**		43	73**	
Above-target firms												
Number of industries with 10 or more observations	38	38		37	37		32	32		30	30	
Percentage of industries with significant, positive rank correlations	53**	3		30**	3		50**	13*		17**	3	
Percentage of industries with a negative association ratio < 1	82**	58		84**	43		88**	69**		77**	50	

* $p < .05$ ** $p < .01$

TABLE 5
Results of Risk-Return Analysis Across Industries

Variables	Accounting-based ROE			Accounting-based ROA			Cash Flow on Equity			Cash Flow Plus Financial Outlays on Total Assets		
	Variance	Coefficient of Variation		Variance	Coefficient of Variation		Variance	Coefficient of Variation		Variance	Coefficient of Variation	
Number of firms	1,066	1,066		1,051	1,051		804	804		797	797	
Below-target firms												
Risk-return rank correlation	-.64**	-.13**		-.41**	-.56**		-.24**	-.59**		-.21**	-.63**	
Negative association ratio	3.26	1.25		1.80	3.46		1.45	2.72		1.33	2.80	
Above-target firms												
Risk-return rank correlation	-.58**	-.04		-.42**	-.11		-.64**	-.16**		-.32**	-.13	
Negative association ratio	0.42	1.06		0.47	1.06		0.37	0.93		0.66	1.29	

* $p < .05$

** $p < .01$

nificant percentages to two, and those two values are considerably lower than the corresponding ones based on variance in returns: 13 (significant at the 5 percent level) versus 50 percent and 69 versus 88 percent (Table 4). The across-industry results shown in Table 5 show the same pattern. The absolute value correlation coefficients are considerably higher with variance measuring risk (.42, .64, and .32 versus .11, .16, and .13), and the negative association ratio differs more from 1 in the predicted direction.

CONCLUSIONS

Combining the Fiegenbaum and Thomas results with those based on Belgian data leads to the inevitable conclusion that prospect theory is potentially extremely useful for the explanation of observed risk-return relations at a firm level. Nevertheless, some qualifications are in order. At the theoretical level, the results obtained from adding three return variables and one risk variable to those used by Fiegenbaum and Thomas are too systematic to be neglected in subsequent refinements of prospect theory. Such refinements should include a theory of how decision makers perceive risk. Is risk perceived as a concept better measured on an absolute scale, through variance in returns, or on a relative scale, with the coefficient of variation? Is this perception contingent on a return position compared to a reference point? In a prospect theory framework, my results suggest that decision makers in firms with above-target-level returns consider risk to be an absolute concept but that decision makers in below-target-level firms consider it a relative concept. If that does not turn out to be the case, the present results do not provide consistent support for prospect theory.

Furthermore, research should address the question of who the relevant decision makers in a firm are—the managers or the shareholders? If it is the latter, researchers should also consider the implications of capital market theory, because that theory assumes an overall positive risk-return relation.

Two confirming studies are not a strong base for general acceptance of prospect theory as part of the theory of economic decision making. More empirical studies using different data bases or data from other countries are required. Miller and Bromiley (1990) is very interesting in this respect, although their results “certainly do not fit with [their] interpretation of prospect theory, [and] pose a puzzle for further theory development” (1990: 775). These developments seem necessary in order to be able to fully understand economic decision making

REFERENCES

- Bowman, E. H. 1980. A risk/return paradox for strategic management. *Sloan Management Review*, 21(3): 17–31.
- Bowman, E. H. 1982. Risk seeking by troubled firms. *Sloan Management Review*, 23(4): 33–42.
- Buijink, W., & Jegers, M. 1986. Cross-sectional distributional properties of financial ratios in

- Belgian manufacturing industries: Aggregation effects and persistence over time. *Journal of Business Finance and Accounting*, 73: 337–363.
- Fiegenbaum, A., & Thomas, H. 1988. Attitudes toward risk and the risk-return paradox: Prospect theory explanations. *Academy of Management Journal*, 31: 85–106.
- Fisher, F. M., & McGowan, J. J. 1983. On the misuse of accounting rates of return to infer monopoly profits. *American Economic Review*, 73: 82–97.
- Jegers, M., & Buijink, W. 1987. A note on the reliability of financial accounting data bases: Some Belgian evidence. *International Journal of Accounting*, 23(1): 1–21.
- Kahneman, D., & Tversky, A. 1979. Prospect theory: An analysis of decision under risk. *Econometrica*, 47: 263–291.
- Kendall, M. G. 1970. *Rank correlation methods*. New York: Hafner Publishing.
- Miller, K. D., & Bromiley, P. 1990. Strategic risk and corporate performance: An analysis of alternative risk measures. *Academy of Management Journal*, 33: 756–779.
- Salamon, G. L. 1985. Accounting rates of return. *American Economic Review*, 75: 495–504.
- Theunisse, H. 1987. Accounting and reporting in Belgium. In K. M. Most (Ed.), *Advances in international accounting*, vol. 1: 191–248. New York: JAI Press.
- Statistical Office of the European Communities. 1985. *General industrial classification of economic activities within the European communities*. Luxembourg: Office for Official Publications of the European Community.

APPENDIX

When an industry consists of risk-averse firms with above-target-level returns and risk-seeking firms with below-target-level returns, the sign of the risk-return correlation measured at an industry level cannot be predicted.

In a hypothetical industry consisting of six firms, three will have above-target returns and three will have below-target returns when the median return is defined as the target, following Fiegenbaum and Thomas (1988). Table 6 presents two situations in which above-target-level firms are risk-averse and below-target-level firms are risk-seeking. In the first situation, the firm with the highest return also has the highest risk. The above-target-level firms are clearly risk-averse, and the below-target-firms clearly risk-seeking. The same conclusions emerge in the second situation, in which the firm with the lowest returns takes the highest risk. Thus, both situations conform to the predictions of prospect theory. When the risk-return association is

TABLE 6
Minimum and Maximum Rank Correlations

Firm Rankings ^a	Maximum Rank Correlation ^b	Minimum Rank Correlation ^b
Above target		
1	1	4
2	2	5
3	3	6
Below target		
4	6	3
5	5	2
6	4	1

^a High returns = 1, low returns = 6.

^b High risk = 1, low risk = 6.

assessed at an industry level, a simple calculation shows that the rank correlation between the risk and the return of the six firms is $+ .77$ in the first case (the highest possible level) and $- .77$ in the second (the lowest possible level). Other risk-return configurations of six firms behaving in accordance with prospect theory predictions yield correlations between $- .77$ and $+ .77$.

Generally, in an industry with N below-target firms and N above-target firms, the industry risk-return correlation R_i meets the following condition:

$$-\frac{3N^2}{4N^2 - 1} \leq R_i \leq \frac{3N^2}{4N^2 - 1},$$

where R_i is the Spearman rank correlation coefficient (Kendall, 1970: 8). For large values of N , this equation implies that R_i lies between $- 75$ and $+ 75$ percent if prospect theory conditions prevail. If not, R_i can take values between $- 1$ and 1 .

Thus, both positive and negative risk-return correlations at an industry level are compatible with prospect theory, as long as the correlations obey the above-mentioned inequalities. The only way to test these predictions is to consider above- and below-target firms separately, as Fiegenbaum and Thomas did.

Marc Jegers earned his Ph.D. degree at the State University of Ghent. He is a professor of management and accounting at the Free University of Brussels. His research interests include industrial economics, financial management, and financial statement analysis.

STYLE GUIDE FOR AUTHORS

ARTICLES

Submit five copies of the manuscript; be sure that they are good, clear copies and that all pages are included in each copy. The manuscript should be typed on standard size (8½" × 11") paper, *double-spaced throughout* (including footnotes, references, quotations, and appendixes), on only one side of the paper, and with wide margins (one inch or more) at top, bottom, and both sides of each page. Manuscripts prepared on computers should be printed on letter quality printers or, if other printers are used, in double-strike or enhanced print. Footnotes, references, appendixes, tables, and figures should be on separate sheets of paper and should be arranged at the end of the manuscript in the order listed in this sentence. There is no absolute limit, but the length of articles should not ordinarily exceed 30 manuscript pages, including references, appendixes, tables, and figures.

Title Page and Abstract

The first page of the manuscript should include the title of the article (typed in all capital letters), the authors' names (typed in all capitals), and their affiliations, addresses, and phone numbers (typed with initial caps only). Example:

THE EFFECTS OF AN ACQUISITIVE GROWTH STRATEGY ON FIRM PERFORMANCE

MICHAEL A. HITT
College of Business Administration
Texas A&M University
College Station, TX 77843-4221
(409) 845-1724

No mention of authors' names should be made in the body of the paper, except where appropriate in citations and references.

The second page, numbered page 2, should repeat the title and include an abstract of 75 words or less. The text of the article should begin on page 3. Page numbering should continue through all pages of the manuscript, including those with footnotes, references, appendixes, tables, and figures.

Acknowledgments

An unnumbered footnote can be used to acknowledge financial support and/or assistance of others in preparing the manuscript. In the manuscript, the text for this footnote should appear at the bottom of the same page as the

abstract (page 2). It should be separated from the abstract by a 10-dash line beginning at the left-hand margin.

Footnotes

Other footnotes should be used sparingly. Minimize their use for parenthetical discussion; material that is pertinent can often be integrated into the text. They should not be used for citing references (see References below). The text for all footnotes should appear on a separate page or pages at the end of the body of the article.

Headings

Main headings should be used to designate the major sections of the article; three or four main headings should be sufficient for most articles. Initial headings, such as "Introduction," are unnecessary. Main headings should be centered on the page and typed in all capitals. They should not be underlined. Example:

METHODS

Secondary headings should be typed flush with the left margin and in small letters, with major words beginning with capitals. Secondary headings should not be underlined. Example:

Sample

Third-order or paragraph headings should begin with a standard paragraph indentation and be typed in capital and small letters, with only the initial word capitalized. Paragraph headings should be followed by a period; they should not be underlined. Example:

Manager sample. Respondents consisted of a random sample of 300 managers. . . .

The text should follow on the same line.

Tables and Figures

Useful tables and figures do not duplicate the text; they supplement and clarify it. Because tables and figures are considerably more expensive to prepare for publication than text, the degree to which they add to the impact of the manuscript should be considered carefully.

Tables should be typed, double-spaced, on separate pages (one page for each table) from the text. They should be grouped together following the appendixes. If there is no appendix, tables should follow the references. For most papers, the first table should report descriptive statistics, including means, standard deviations, and a complete intercorrelation matrix. Each table should have the word TABLE (typed in all caps) and its number (arabic numerals) centered at the top. The table title should be in capital and small

letters and centered on the page directly under the table number; it should not be underlined. Example:

TABLE 1
Firms in Sample

Tables should be numbered consecutively from the beginning to the end of the article. The position of the table in the manuscript should be indicated in the text as follows:

Insert Table 1 about here

Footnotes to tables are of two types:

- (1) General footnotes that explain the table as a whole, the designations of table columns or rows, or an individual item. All of these should be designated by superscript small letters (^{a,b,c}), with the footnotes for each separate table beginning with ^a.
- (2) Footnotes used to indicate the level of significance should follow any other footnotes and be designated by one or more asterisks: * for $p < .05$, ** for $p < .01$, and *** for $p < .001$. Use a dagger symbol (†) for $p < .10$.

If it is necessary to distinguish some numerals in a table from others (for example, to indicate which factor loadings define a factor), boldface type can be used. In the typed manuscript, any numerals that should be set in boldface type should be underlined with a wavy line. This possibility should not be used when other conventions, such as footnotes, are sufficient.

Figures are any illustrations other than tables. Authors should be prepared to supply finished camera-ready artwork for all figures at the time the manuscript is accepted for publication. Unless the authors are highly skilled in graphics, a professional drafting service should be employed to prepare figures.

The spacing and lettering used in figures should allow for subsequent reduction in size by as much as 50 percent so that the figure will fit the size of the *Journal's* page. The original artwork for figures should not be submitted until after the manuscript has been accepted for publication.

Figures should be numbered consecutively with arabic numerals and their position in the text indicated as for tables (see above). Each figure should be presented on a separate page with FIGURE (typed in all caps) and its number centered above it and a short identifying title in capital and small letters centered underneath the figure number. Example:

FIGURE 1
Model of Contextual Influences on Performance

The position of the figure in the manuscript should be indicated in the text as follows:

Insert Figure 1 about here

References

An alphabetically ordered list of references cited in the text should be included at the end of the article. References should begin on a separate page headed REFERENCES. Continue the pagination.

Entries in the list of references should be alphabetized by the last name of the author (first author if more than one) or editor, or by the corporate author (U.S. Census Bureau) or periodical name (*Wall Street Journal*) if there is no indication of individual authors or editors. Several references by an identical author (or group of authors) are ordered by year of publication, with the earliest listed first. Multiple references to works by one author or group of authors with the same year of publication should be differentiated with the addition of small letters (a, b, etc.) after the year. Authors' names are repeated for each entry.

Citations to references should be designated throughout the text by enclosing the authors' names and the year of the reference in parentheses. Example:

Several studies (Adams, 1974; Brown & Hales, 1975, 1980; Collins, 1976a,b) support this conclusion.

Note the use of alphabetical order and an ampersand in citations.

Page numbers must be included in a citation to provide the exact source of a direct quotation. Page numbers follow the date of publication given in parentheses and are separated from it by a colon. Example:

Adams has said that writing a book is "a long and arduous task" (1974: 3).

They should also be used when specific arguments or findings of authors are paraphrased or summarized. As indicated in the example, if the name of the author occurs in the body of the sentence, only the year of publication is cited in parentheses. Otherwise, both name and date appear in parentheses, separated by a comma.

If a work has two authors, always cite both names every time the work is cited in the text. If the work has more than two authors, cite all authors the first time the reference occurs; in subsequent citations of the same work, include only the surname of the first author followed by "et al." (not underlined) and the year. Examples:

Few field studies use random assignment (Franz, Johnson, & Schmidt, 1976).
(first citation)

... even when random assignment is not possible (Franz et al., 1976: 23).
(subsequent citation)

However, for works with six or more authors, use only the surname of the first author followed by et al. whenever the work is cited.

Book entries in the list of references follow this form: Authors' or Editors' Last Names, Initials. Year. Title of book. (Book titles are underlined and typed in lower case letters except for the first word and the first word after a colon.) City Where Published, State or Country (only if necessary to iden-

tify the city; use U.S. Postal Service abbreviations for state identification): Name of Publisher. Examples:

- Boulding, K. E. 1956. The image. Ann Arbor: University of Michigan Press.
 Kahn, R. L., & Boulding, E. (Eds.). 1964. Power and conflict in organizations. Glencoe, IL: Free Press.
 Katz, D., & Kahn, R. L. 1978. The social psychology of organizations (2nd ed.). New York: John Wiley & Sons.
 U.S. Department of Labor Statistics. 1976–1983. Employment and earnings. Washington, DC: U.S. Government Printing Office.

Periodical entries follow this form: Authors' Last Names, Initials. Year. Title of article or paper (in lower case letters except for the first word and the first word after a colon). Name of Periodical, volume number (issue number): page numbers. Examples:

- Fry, L. W., & Slocum, J. W., Jr. 1984. Technology, structure, and workgroup effectiveness: A test of a contingency model. Academy of Management Journal, 27: 221–246.
 Goggin, W. C. 1974. How the multidimensional structure works at Dow Corning. Harvard Business Review, 55 (1): 54–65.

This issue number should only be included if the periodical's pages are not numbered consecutively throughout the volume, that is, if each issue begins with page 1.

If a periodical article has no author, the name of the periodical should be treated like a corporate author, both in the citation and in the references. For example:

There is fear that Social Security rates may rise (Wall Street Journal, 1984).

Wall Street Journal. 1984. Inflation rate may cause Social Security increase. September 24: 14.

Chapters in books follow this form: Authors' Last Names, Initials. Year. Title of chapter (in lower case except for the first word and first word after a colon). In Editors' Initials and Last Names (Eds.), Title of book: page numbers. City Where Published, State or Country (only if necessary to identify the city): Name of Publisher. Examples:

- Berg, N. A. 1973. Corporate role in diversified companies. In B. Taylor & I. MacMillan (Eds.), Business policy: Teaching and research: 298–347. New York: John Wiley & Sons.
 Roberts, F. S. 1976. Strategy for the energy crisis: The case of commuter transportation policy. In R. Axelrod (Ed.), Structure of decision: 142–179. Princeton, NJ: Princeton University Press.

Unpublished papers, dissertations, and presented papers should be listed in the references using the following formats:

- Duncan, R. G. 1971. Multiple decision making structures in adapting to environmental uncertainty. Working paper no. 54–71, Northwestern University Graduate School of Management, Evanston, IL.
 Smith, M. H. 1980. A multidimensional approach to individual differences in empathy. Unpublished doctoral dissertation, University of Texas, Austin.
 Wall, J. P. 1983. Work and nonwork correlates of the career plateau. Paper presented at the annual meeting of the Academy of Management, Dallas, TX.

Appendixes

Lengthy but essential methodological details, such as explanations of long lists of measures should be presented in one or more appendixes at the end of the article. This material should be presented in as condensed a form as possible; full sentences are not necessary. No tables should be included in the appendixes. A single appendix should be titled APPENDIX in all caps. If more than one appendix is needed, they should be titled and ordered alphabetically: APPENDIX A, APPENDIX B, etc.

Biographical Sketches

At the time an article is accepted for publication, a brief biographical sketch of 50 words or less should be submitted for each author. It should include where highest degree was earned, present position, affiliation, and current research interests. For example:

Andrea Barber earned her Ph.D. degree at the University of Wisconsin; she is an associate professor of management and Director of the Management Improvement Center at Famous University, Oxbridge, Ohio. Her current research interests include dual-career families and sociotechnical systems in organizations.

RESEARCH NOTES

Research notes contain brief descriptions of original research. To be considered for the Research Notes section, manuscripts should not exceed 15 double-spaced typewritten pages in length. Descriptive surveys, replications, methodological demonstrations or analyses, studies that make incremental advances to established areas of inquiry, and commentaries with new empirical content are especially appropriate.

Manuscripts intended for the Research Notes section should be prepared according to the above instructions for articles, except that the abstract should not exceed 50 words in length.

GENERAL USAGE

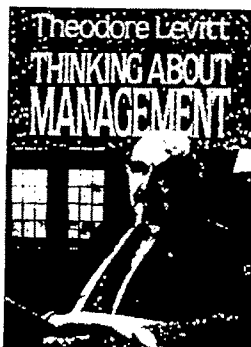
Avoidance of Sexist and Other Biased Language

Authors must avoid terms or usages that are or may be interpreted as denigrating to ethnic or other groups. Authors should be particularly careful in dealing with gender, where long-established customs (e.g., the use of "men and girls" in the office or "usually if the employee is given an opportunity, he will make the right choice") can imply inferiority where none exists or the acceptance of inequality where none should be tolerated. Using plural pronouns (e.g., changing the "client . . . he" to "clients . . . they" is preferred by Academy publications. If this is not possible, the phrase "he or she" can and should be used.

Use of First Person

Vigorous, direct, clear, and concise communication should be the objective of all articles in Academy journals. Although third-person style traditionally has been used, authors can use the first person and active voice if they do not dominate the communication or sacrifice the objectivity of the research.

The Leaders.



THINKING ABOUT MANAGEMENT

Theodore Levitt, *Harvard Business School*

"Few things are more important for a good manager to do than to ask simple questions," asserts Ted Levitt, author of *The Marketing Imagination*. "It is not to get answers, but to get people to think rather than just to act, react, or administer." This concept sets the tone for these 27 brilliant briefings in which Levitt expounds some eternal truths about three phases of the managerial mind: thinking ("management scientists confuse thinking with merely being logical"); changing ("one of the central occupying activities of modern management has become change itself"); and operating ("a business is about only two things—money and customers").

1990 ISBN: 0-02-918605-6 \$17.95

MANAGING ACQUISITIONS Creating Value Through Corporate Renewal

Philippe C. Haspeslagh, *INSEAD*, and
David B. Jemison, *University of Texas, Austin*

Based on eight years of research at 20 companies in the United States, Europe, and Japan, Haspeslagh and Jemison argue that conventional views of corporate acquisitions focus on pre-acquisition strategic fit which address only the potential for value creation. Real value, they show is created only after the acquisition, and with managerial actions not financial engineering. They provide a close look at the ways experienced acquirers are coping with acquisition decisions—and tell a tale of strategic vision, leadership, and a commitment to making organizations more capable of learning and change.

1991 ISBN: 0-02-914165-6 \$35.00



CRACKING THE JAPANESE MARKET

Strategies for Success in the New Global Economy

James C. Morgan, *Applied Materials, Inc.*,
and J. Jeffrey Morgan, *Sun Microsystems*

In this brilliant examination of Japanese markets, companies, and business practices—the centerpiece of which is the establishment of Applied Materials Inc., the leading supplier of advanced processing equipment to the worldwide semiconductor industry which today does nearly fifty percent of its business in Japan—the Morgans, father and son, contend that success in the world of Japanese business is determined by two factors: technology and relationships. The authors provide valuable insights into the specific problems facing Western companies in establishing a direct presence in Japan: in financing the venture, product design and production, marketing and distribution, and most important, establishing long-term partnerships, or "putting on a Japanese face."

1991 ISBN: 0-02-921691-5 \$24.95

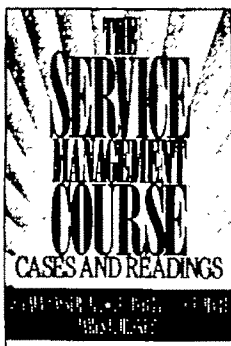
RETHINKING BUSINESS-TO-BUSINESS MARKETING

Paul Sherlock, *Raychem Corporation*

"This is a practical, profound, and powerful book. Its breadth is stunning... Sherlock breaks new ground (marketing, selling, middleman relationships, product development, organization) and snickers at conventional wisdom. It is at once wildly challenging, deadly serious, and absurdly fun."

—from the Foreword by Tom Peters, author of *Thriving on Chaos*

1991 ISBN: 0-02-928615-8 \$19.95



Two New Texts—

THE SERVICE MANAGEMENT COURSE Cases and Readings

W. Earl Sasser, Jr., *Harvard Business School*
Christopher W.L. Hart, *The TQM Group, Ltd.*
James L. Heskett, *Harvard Business School*

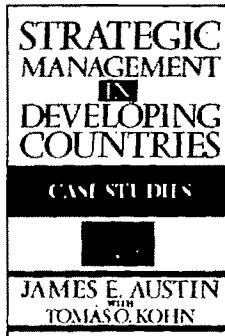
In this companion volume to *Service Breakthroughs: Changing the Rules of the Game*, Sasser, Hart and Heskett present 35 in-depth case studies and eight readings which focus on "break-through" service providers—firms which have changed the rules of the game in their industries. Designed for classroom adoption in business schools or as a text for in-house corporate training programs on service management, this volume includes dramatic case studies of Club Med, Ford Motor Company, UPS, Florida Power & Light, Federal Express, Nordstrom, and many others, which demonstrate how these firms define their "service concept", target market segments, and view a service delivery system as an opportunity to enhance the quality of their service.

1991 ISBN: 0-02-914091-9 \$40.00

SERVICE BREAKTHROUGHS Changing the Rules of the Game

James L. Heskett, W. Earl Sasser, Jr.,
Harvard Business School
and Christopher W.L. Hart,
The TQM Group, Ltd.

1990 ISBN: 0-02-914675-5 \$27.95



STRATEGIC MANAGEMENT IN DEVELOPING COUNTRIES Case Studies

James E. Austin, *Harvard Business School*
with Tomas O. Kohn

Designed for business school courses and in-house company training programs, this companion to *Managing in Developing Countries* presents 35 case studies organized around Professor Austin's Environmental Analysis Framework, a powerful, field-tested tool designed to help managers examine, prepare for, and compete in the Third World business environment. From Nike in China to Standard Fruit in Nicaragua, these cases examine the economic, political, and cultural factors of each country, and reveal the critical strategic issues and operating problems that managers will encounter in developing countries.

1990 ISBN: 0-02-901105-1 \$40.00

MANAGING IN DEVELOPING COUNTRIES Strategic Analysis and Operating Techniques

James E. Austin, *Harvard Business School*

1990 ISBN: 0-02-901102-7 \$35.00

*For Visa, MasterCard, or
American Express orders,
call toll-free 1-800-323-7445
between 9am-5:30pm Eastern time.*

FP THE FREE PRESS
A Division of Macmillan Inc., 866 Third Avenue, New York, NY 10022
THE BEST IN THE BUSINESS.

IRWIN's

1991

Tour

ORGANIZATIONAL BEHAVIOR

*Just
Published*

ORGANIZATIONS: Behavior,
Structure and Processes, 7/e
Gibson, Ivancevich & Donnelly

*Just
Published*

ORGANIZATIONAL BEHAVIOR, 4/e
Organ & Bateman

THE APPLIED PSYCHOLOGY OF WORK
BEHAVIOR: Book of Readings, 4/e
Organ

*Just
Published*

CASES IN ORGANIZATION
DEVELOPMENT
Glassman & Cummings

*Just
Published*

DESIGNING ORGANIZATIONS, 3/e
Robey

STRATEGIC MANAGEMENT

BUSINESS POLICY:

Text and Cases, 7/e
Bower, Bartlett, Christensen,
Pearson & Andrews

STRATEGIC MANAGEMENT:

Formulation, Implementation
and Control, 4/e
Pearce & Robinson

FORMULATION, IMPLEMENTATION AND CONTROL OF COMPETITIVE

STRATEGY, 4/e
Pearce & Robinson

CASES IN STRATEGIC MANAGEMENT, 2/e

Pearce & Robinson

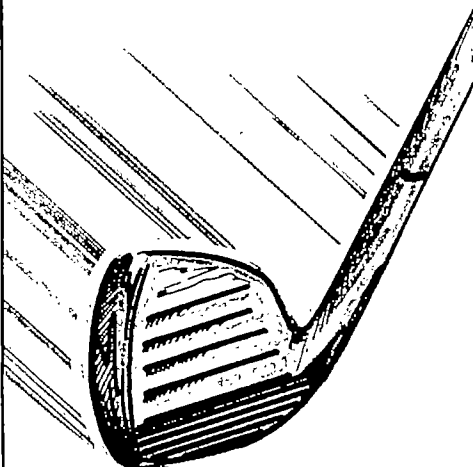
STRATEGIC MANAGEMENT PRACTICE

Pearce & Robinson

Also Available!

STRATEGIC MANAGEMENT:
Concepts, Decisions, Cases, 2/e
Digman

STRATEGIC MANAGEMENT:
Concepts and Cases, 5/e
Thompson & Strickland



HUMAN RESOURCE MANAGEMENT

*Just
Published*

HUMAN RESOURCE
MANAGEMENT, 3/e
Byars & Rue

PERSONNEL/HUMAN RESOURCE
MANAGEMENT, 6/e
Milkovich & Boudreau

MANAGING HUMAN RESOURCE
DECISIONS:
A Computer Based Case Approach
Peters, Greer & Large

*Just
Published*

CASES AND EXERCISES IN HUMAN
RESOURCE MANAGEMENT, 5/e
Stevens

ADDITIONAL IRWIN TITLES

*Just
Published*

INTERNATIONAL MANAGEMENT:
Text and Cases
Beamish, Killing, Lecraw & Crookell

THE ETHICS OF
MANAGEMENT, 2/e
Hosmer

*Just
Published*

SUPERVISION:
Working with People, 2/e
Catt & Miller

*Just
Published*

SUCCESSFUL SMALL BUSINESS
MANAGEMENT, 6/e
Meggison, Scott & Meggison

*Just
Published*

DEVELOPING A STRATEGIC
BUSINESS PLAN WITH CASES:
An Entrepreneur's Advantage
Crowner

Also Available!

MANAGEMENT: Function & Strategy
Bateman & Zeithaml

FUNDAMENTALS OF
MANAGEMENT, 7/e
Donnelly, Gibson & Ivancevich

QUANTITATIVE METHODS

QUANTITATIVE ANALYSIS FOR
BUSINESS DECISIONS, 8/e
Bierman, Bonini & Hausman

*Just
Published*

FUNDAMENTALS OF OPERATIONS
MANAGEMENT
Aquilano & Chase

*Just
Published*

OPERATIONS MANAGEMENT:
Improving Customer Service, 4/e
Schonberger & Knod

SPREADSHEET APPLICATIONS FOR
PRODUCTION AND OPERATIONS
MANAGEMENT
Finch & Luebbe

DECISION SUPPORT SYSTEMS FOR
PRODUCTION AND OPERATIONS
MANAGEMENT FOR USE WITH
IBM PC, 2/e
Lotfi & Pegels

FUNDAMENTALS OF
MANAGEMENT SCIENCE, 5/e
Turban & Meredith

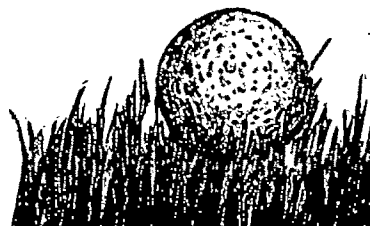
BUSINESS RESEARCH
METHODS, 4/e
Emory & Cooper

Also Available!

PRODUCTION/OPERATIONS
MANAGEMENT, 3/e
Stevenson

IRWIN

1818 Ridge Road
Homewood, IL 60430
1-800-323-4560



**NANYANG TECHNOLOGICAL INSTITUTE**

Singapore

(To be reconstituted and renamed the Nanyang Technological University in 1991)

**TEACHING APPOINTMENTS
IN THE
SCHOOL OF ACCOUNTANCY AND BUSINESS
(DIVISION OF AUDITING & SYSTEMS)**

The School of Accountancy and Business, which offers graduate and undergraduate degree programmes in Accountancy and Business, has openings for faculty positions in Information Systems.

The School has set up a Centre for Information Technology Research to foster and give recognition to IS research. Recently, it entered into an agreement with the Sloane School of Management at MIT to facilitate research collaboration. Opportunities in IS research abound in Singapore with the government focusing on IT as a key national strategy. Innovative IT applications developed in Singapore have won many international awards, including the Partners in Leadership award by the Society for Information Management in 1989.

Applicants should have a PhD degree in IS or a related field, and be able to teach courses and supervise research students in IS. The level of appointment will depend on the professional, teaching, and research experience of the candidate.

Gross annual emoluments range as follows:

Professor	: S\$108,870—S\$146,970
Associate Professor	: S\$ 88,650—S\$122,870
Senior Lecturer	: S\$ 58,680—S\$100,310
Lecturer	: S\$ 50,390—S\$ 64,200

(US\$1.00 = S\$1.70 approximately)

In addition to the above, the Institute adopts the Government's practice in the payment of an annual variable bonus, the quantum of which is tied to national economic performance and has, in past years, ranged from 1 to 2½ months' salary.

The commencing salary will depend on the candidates' qualifications, experience, and the level of appointment offered.

Leave and medical benefits will be provided. Depending on the type of contract offered, other benefits include: provident fund benefits or end-of-contract gratuity of 25% of the staff member's last drawn monthly salary for each completed month of service, a setting-in allowance, subsidised housing, education allowance up to a maximum of S\$30,000 per annum, passage assistance, baggage allowance and car loan.

The Institute encourages its staff members to undertake outside consulting work of a specialist nature. They are permitted to earn and retain such consultation fees up to a maximum of 60% of their gross annual emoluments in any one calendar year.

For more information contact the Institute through BITNET to:TFWANG@NTIVAX

Candidates wishing to be considered should write to:

**THE REGISTRAR
NANYANG TECHNOLOGICAL INSTITUTE
NANYANG AVENUE, SINGAPORE 2283**

giving their curriculum vitae and the names and addresses of three referees.

The Difference Is Dryden

New in 1991

Management

Second Edition

Richard L. Daft *Vanderbilt University*

Organizational Behavior

Second Edition

Robert P. Vecchio

University of Notre Dame

Organizations: Theory and Design

Arthur G. Bedeian

Louisiana State University

Raymond F. Zammuto

University of Colorado at Denver

The Labor Relations Process

Fourth Edition

William H. Holley, Jr.

Auburn University

Kenneth M. Jennings

University of North Florida

Business Research Methods

Third Edition

William G. Zikmund

Oklahoma State University

Cases in Strategic Management

Jeffrey S. Bracker

George Mason University

John R. Montanari

California State University, San Marcos

Cyril P. Morgan

Washington State University

Business Communication:

Strategies and Skills

Fourth Edition

Richard C. Huseman

University of Central Florida

James M. Lahiff

University of Georgia

John M. Penrose, Jr.

San Diego State University

Contemporary

Business Report Writing

Second Edition

Iris I. Varner *Illinois State University*

Key 1990 Texts

Organizational Behavior: A Management Challenge

Gregory B. Northcraft

University of Arizona

Margaret A. Neale

Northwestern University

Strategic Management: A Choice Approach

John R. Montanari

California State University, San Marcos

Cyril P. Morgan

Washington State University

Jeffrey S. Bracker

George Mason University

Modern Human Relations at Work

Fourth Edition

Richard M. Hodgetts

Florida International University

International Business

Michael R. Czinkota

Georgetown University

Pietra Rivoli

Georgetown University

Ilkka A. Ronkainen

Georgetown University

Human Resource Selection

Second Edition

Robert D. Gatewood

University of Georgia

Hubert S. Feild

Auburn University



The Dryden Press

908 North Elm, Suite 101

Hinsdale, IL 60521-3625

800-323-7437 (ext. 103)

708-920-2450 (ext. 103)



**SOUTH-WESTERN SERIES IN
HUMAN RESOURCES MANAGEMENT**

Consulting Editor

Gerald R. Ferris

Consulting Editor

Kendrith M. Rowland

STRATEGY AND HUMAN RESOURCES MANAGEMENT

John E. Butler, University of Washington

Gerald R. Ferris, University of Illinois

Nancy K. Napier, Boise State University

RESEARCH METHODS IN HUMAN RESOURCES MANAGEMENT

Neal W. Schmitt, Michigan State University

Richard J. Klimoski, Ohio State University

SELECTION INTERVIEWS

Robert Dipboye, Rice University

**COMPENSATION, ORGANIZATIONAL STRATEGY,
AND FIRM PERFORMANCE**

Luis R. Gomez-Mejia, Arizona State University

David B. Balkin, University of Colorado-Boulder

Also available from South-Western

PERSONNEL/HUMAN RESOURCES MANAGEMENT SKILLS MODULES

M. Susan Taylor, University of Maryland

J. Kline Harrison, Management Consultant, Washington, D.C.

Thirty-five modules available individually, as a set,
or in customized packages.

***For more information on these and other texts from
South-Western, please contact your local representative or write to:***



COLLEGE DIVISION South-Western Publishing Co.

5101 Madison Road
Cincinnati, Ohio 45227

Managing for Quality, Quality in Management

Two of South-Western's best – revised for the 1990's!

MANAGEMENT, 2nd Edition

Ramon J. Aldag, University of Wisconsin-Madison

Timothy M. Stearns, Marquette University

Unique in its realistic treatment of management principles and theory, this Second Edition of *Management* offers a number of updates and revisions, including:

- 80% new real-world cases, for a total of 48
- thorough coverage of ethics in relation to management
- two new chapters, "Quantitative Tools for Managing" and "Change and Culture"
- revised coverage of small business, including intrapreneurship and entrepreneurial strategies
- new and updated Practitioner and Academic Profiles

Chapters have been reordered for a more logical, concise flow of information. A four-color format, numerous photographs, charts and illustrations, and a cleaner design add to visual appeal. Comprehensive supplemental packages are available for instructors and students.

SMALL BUSINESS MANAGEMENT, 8th Edition

Justin G. Longenecker and Carlos Moore, Baylor University

This popular text has been made even better with a host of improvements, updates, and new supplements, including:

- full-color design, unique in the field
- an extensive supplemental package, including 100 color transparencies and videotapes from the SCC telecourse, *Something Ventured*
- increased, updated coverage of entrepreneurship, planning, marketing, the legal environment, computers, technology, and the start-up plan

Chapter features include:

- profiles of small business managers
- "Small Business in Action" examples
- new "You Make the Call" short cases
- new longer cases

For more information on these and other texts from South-Western, contact your local representative or write to:



COLLEGE DIVISION South-Western Publishing Co.

5101 Madison Road
Cincinnati, Ohio 45227

Teach Your Students How To Manage Without You.

MANAGEMENT

Second Edition

PETER SCHODERBEK

University of Iowa

RICHARD A. COSIER

Indiana University

JOHN C. APLIN

Sumner Group, Inc.

Hardcover, 1991

Discover the research-based approach that earned rave reviews in its *First Edition*. Now, **MANAGEMENT, Second Edition**, integrates new material on ethics, innovation, and international management. New chapters examine "entrepreneurship" and "organizational culture." Lively and eminently readable, with a new four-color design, this textbook will appeal to students and teachers alike.

MANAGEMENT

Third Edition

RICHARD M. HODGETTS

Florida International University

DONALD F. KURATKO

Ball State University

Hardcover, 1991

A refreshingly clear functional approach, integrating theory and practical applications throughout. **MANAGEMENT, Third Edition**, features a new chapter on "entrepreneurship," updated chapter-ending cases and problems, comprehensive section-ending cases, a wealth of contemporary examples, and an engaging new design.

INTERNATIONAL BUSINESS A New Era

NANSHI F. MATSUURA

University of San Francisco

Hardcover, 1991

This new, thorough, and up-to-date presentation, based on worldwide surveys and interviews conducted by the author, examines international business topics from various perspectives. Distinctive chapters explore Japanese business, East-West trade, developing countries, technology transfer, and centrally planned economies.

HB

HARCOURT BRACE JOVANOVICH, INC.

College Sales Office

7555 Caldwell Avenue, Chicago, IL 60648 • (708) 647-8822

The Joseph M. Bryan Distinguished Professor of Business

The University of North Carolina at Greensboro

The Bryan School of Business and Economics invites nominations and applications for an endowed chair: The Joseph M. Bryan Professor of Business.

We are seeking a person with a distinguished record of research and teaching who has a breadth of vision concerning the nature and role of business. The Bryan Distinguished Professor of Business will be appointed in the Department of Management and Marketing but will be expected to build strong relationships and exercise leadership within the Department, School, University, and business community. The holder of this professorship should be able to serve as a mentor for faculty within the Bryan School. The ideal candidate will have a broad interdisciplinary research record in organizational behavior, strategic management, leadership, business ethics or other related areas. In addition, the Bryan Distinguished Professor of Business will be expected to develop significant relationships with the business community and organizations such as the Center for Creative Leadership and the Research Triangle Institute.

The Bryan School of Business and Economics has one of the largest MBA programs in the state and is accredited by the American Assembly of Collegiate Schools of Business. The School has a close working relationship with the Center for Creative Leadership.

The University of North Carolina at Greensboro is one of three doctoral-granting state universities in North Carolina and is located in the Piedmont region, midway between the Blue Ridge Mountains and the Atlantic shore. It lies within easy commuting distance of Duke University, North Carolina State University, the University of North Carolina at Chapel Hill, and the Research Triangle Institute.

Salary is competitive. Appropriate research and support funds are available. Applications will be accepted until the position is filled.

Interested persons should contact Professor Terry W. Mullins, Bryan Search Committee Chair, Department of Management and Marketing, University of North Carolina at Greensboro, Greensboro, NC 27412-5001 (Phone: 919-334-5691).

An Equal Opportunity, Affirmative Action Employer

University of Washington Seattle, Washington

Position in Business Policy and Strategy From September 1991

The Department of Management and Organization is inviting applications from individuals with strong research training and emphasis on strategy. Applicants should have the capacity for becoming effective teachers and researchers. Some literacy in Economics and exposure to International Business are desirable. Preference will be given to applicants at the Assistant Professor level. Salary is competitive.

The Department of Management and Organization encompasses Business Policy and Strategy, Organization and Environment, and Human Resource Management and Organizational Behavior. The focus of Business Policy is a multi-disciplinary approach to integrate functional areas. Entrepreneurship is included in the area.

Applicants should have completed the Ph.D. degree or expected completion by Fall 1991. University of Washington is an equal opportunity/affirmative action employer. We especially welcome applications from women and minorities. Please mail your curriculum vita and other supporting material including references, dissertation proposal or abstract and copies of research papers which might be helpful to our search committee to: Borje O. Saxberg, Professor and Chairman, Department of Management and Organization, University of Washington, DJ-10, Seattle, WA 98195.

HARVARD BUSINESS



SCHOOL PRESS

BREAKING FINANCIAL BOUNDARIES

Global Capital, National Deregulation, and Financial Services Firms
David M. Meerschman
This in-depth look at the changing world of financial services explores the forces at work in international finance, describes the dramatic effects of deregulation, and shows how financial services firms have had to alter their strategies and develop new skills in order to compete.
May 1991 300 pages
253-4 \$35.00



NOW AVAILABLE IN PAPERBACK:

RELEVANCE LOST
The Rise and Fall of Management Accounting
H. Thomas Johnson & Robert S. Kaplan
"...a fascinating history of management accounting... Impressive in its scope, clarity and readability... Every finance director of a multinational (and its auditors and finance staff) could learn from it."
—*The Economist*
"If taken to heart, [this book] could be a survival manual for troubled industries."
—*The Wall Street Journal*
March 1991 300 pages
254-2 \$15.95

ISBN Prefix 0-87584

MANAGING THE LINK TO CORPORATE STRATEGY



BY PHILIP A. ROUSSEL
KAMAL N. SAAD
TAMARA J. ERICKSON

R&D is a pragmatic method for linking R&D to long-term business planning. The authors show managers how to integrate technology and research capabilities with overall management and strategy.

April 1991 325 pages ISBN 0-87584-252-6 \$29.95

STRATEGY

Seeking and Securing Competitive Advantage

Cynthia A. Montgomery & Michael E. Porter, Editors

This collection of *Harvard Business Review* articles provides managers with the best thinking available on how to make the critical, long-term decisions that determine business success. Contributors including Michael Porter, Kenichi Ohmae, Alfred D. Chandler, Jr., Henry Mintzberg, and others show how advantage can and should be extracted from many sources, from marketing and joint ventures to financial analysis.

A Harvard Business Review Book
May 1991 400 pages ISBN 0-87584-243-7 \$29.95

EDUCATION FOR JUDGMENT

The Artistry of Discussion Leadership

C. Roland Christensen, David A. Garvin, & Ann Sweet, Editors

Discussion teaching — the foundation of the Harvard Business School's case method of instruction — is a powerful tool for developing skills as well as conveying knowledge. The contributors to **EDUCATION FOR JUDGMENT** explore various aspects of this method. Many of the essays describe the building blocks of successful group leadership; others take a broader, more philosophical view of discussion leadership, covering such issues as ethical concerns.

June 1991 300 pages ISBN 0-87584-255-0 \$29.95

THIRD GENERATION R&D

Managing the Link to Corporate Strategy

Philip A. Roussel, Kamal N. Saad, & Tamara J. Erickson

Three senior consultants from Arthur D. Little provide managers with a new approach that will make R&D a truly competitive weapon. The third generation of



PRINCIPALS AND AGENTS
The Structure of Business
John W. Pratt & Richard J. Zeckhauser, Editors
New in paperback
Available 272 pages
256-9 \$14.95

PREVIOUSLY ANNOUNCED:

THE AGE OF UNREASON
Charles Handy
Foreword by Warren Bennis
Named one of the "ten best business books of 1990" by *Business Week*
Available 278 pages
246-1 \$18.95

CORPORATE IDENTITY
Making Business Strategy Visible Through Design
Wally Olins
Available 224 pages
250-X \$50.00

GOOD INTENTIONS ASIDE
A Manager's Guide to Resolving Ethical Problems
Laura L. Nash
Available 337 pages
225-9 \$24.95

SHAPING THE FUTURE
Business Design Through Information Technology
Peter G. W. Keen
March 1991 250 pages
237-2 \$29.95

HEARING THE VOICE OF THE MARKET
Competitive Advantage Through Creative Use of Market Information
Vincent P. Barabba & Gerald Zaltman
Available 250 pages
241-0 \$29.95



HARVARD BUSINESS SCHOOL PRESS

Boston, MA 02163

To order, call
1-800-545-7685

1991 Personnel/Human Resources Scholarly Achievement Award CALL FOR NOMINATIONS

The Personnel/Human Resources Division of the Academy of Management announces a call for nominations for its annual "Scholarly Achievement Award." The award will be presented to a work published in recognized periodical outlets, such as journals and research annuals, that are generally available to division members. Nominated papers must have a publication date of 1990. Recipients of the award need not belong to the Academy of Management or the Personnel/Human Resources Division.

The Personnel/Human Resource Scholarly Achievement Award is given for the most significant publication on issues important to the Personnel/Human Resource Management field. Publications may be empirically or non-empirically based. Papers nominated for this award will be judged with regard to the extent of their contribution to the advancement of the field.

Individuals may nominate one publication for the award. Nominations should be made by a letter to the Chair of the Awards Committee and should include (a) a rationale justifying receipt of the award by the nominee(s), and (b) a full bibliographic citation for the nominated work. Self-nominations will not be accepted.

The award winner will be announced at the August 1991 Academy of Management meeting, during the Personnel/Human Resource Division's business meeting. Award recipients will be presented with a plaque of recognition.

All nominations should be sent to John Boudreau, Center for Advanced Human Resource Studies, School of Industrial and Labor Relations, Cornell University, 393 Ives Hall, Ithaca, New York, 14851-0952. **To receive consideration, nominations must be postmarked no later than March 14, 1991.**

CALL FOR AWARD NOMINATIONS

The Organizational Behavior Division of the Academy of Management announces its annual call for nominations for its "Outstanding Publication in Organizational Behavior Award." The award will be presented to a publication appearing during the 1990 calendar year in recognized outlets that are generally available to division members. Recipients of the award need not belong to the Academy of Management.

The "Outstanding Publication in Organizational Behavior Award" is given for the most significant contribution to the advancement of the Organizational Behavior field. Theoretical and empirically-based research publications are eligible.

Each Academy of Management member may nominate one publication for the award, but no member may nominate more than one publication. Nominations should be made in writing and must include (a) a rationale justifying receipt of the award by the nominee(s), and (b) a full bibliographic citation of the nominated work. Self-nominations will not be accepted. **To receive consideration, material must be postmarked no later than March 30, 1991.**

The recipient of the award will be announced at the August 1991 Academy meeting during the OB Division's business meeting and will be presented a certificate of recognition.

All nominations should be sent to Susan E. Jackson, Department of Psychology, 3210 Tolman Hall, University of California, Berkeley, CA 94720

**NOMINATIONS REQUESTED FOR THE POSITIONS OF
EDITOR-IN-CHIEF AND MANAGING EDITOR:
JOURNAL OF MANAGEMENT**

The Officers and the Board of Governors of the Southern Management Association are requesting nominations for the position of Editor-In-Chief, *Journal of Management*. The individual selected will serve as the Editor-In-Chief Designate for one year from November of 1991 until July 1992. At that time, with the concurrence of the Board of Governors, the individual will begin a three year term as Editor-In-Chief until July of 1995.

Selection criteria include:

1. A demonstrated record of academic research and contributions to the field of management.
2. Availability of institutional support, especially to meet telephone and clerical demands.
3. Experience as a reviewer or editor of a professional/academic publication.
4. Commitment to close and cooperative working relations with the Board and Officers of SMA.
5. Some demonstration of administrative competence.

Nominations should be received by July 1, 1991, with final selection to be made at the Board of Governors meeting in November of 1991. Each nomination should be accompanied by a supporting statement of no more than three pages. A statement from the candidate's department chair committing institutional support should also be included.

The Officers and the Board of Governors of the Southern Management Association are also requesting nominations for the position of Managing Editor. The individual selected will work closely with the Editor-In-Chief and printer and will be responsible for the activities associated with publishing the *Journal of Management*. He or she will serve as the Managing Editor Designate for one year from January of 1992 until January 1993. At that time, with the concurrence of the Editor-In-Chief of the *Journal of Management* and the Board of Governors, the individual will begin a three year term as Managing Editor until January of 1996.

Selection criteria include:

1. A demonstrated record of academic service and contributions to the field of management.
2. A demonstrated record of administrative responsibility.
3. Availability of institutional support, especially to meet telephone and clerical demands.
4. Ability to work within a budget.
5. Willingness to meet deadlines.
6. Commitment to cooperative working relations with the Editor-In-Chief and the Officers of SMA.

Nominations should be received by July 1, 1991, with final selection to be made by December 1991. Each nomination should be accompanied by a supporting statement of no more than three pages. A statement from the candidate's department chair committing institutional support should also be included.

Members of the search committee are: Mark J. Martinko (Chair), Florida State University; Terry Leap, Clemson University; and Ricky W. Griffin, Texas A&M University.

Please address inquiries about the nature of the positions to Mark J. Martinko, (904)-644-7846/(904)-893-2786. Please send nominations to:

Mark J. Martinko
Department of Management
College of Business
Florida State University
Tallahassee, Florida 32306



The Academy of Management

JOURNAL

Articles

Self-Regulation for Managerial Effectiveness: The Role of Active Feedback Seeking

Susan J. Ashford and Anne S. Tsui

Victims and Shareholders: The Dilemmas of Presenting Corporate Policy During a Crisis

Alfred A. Marcus and Robert S. Goodman

Turbulence at the Top: A New Perspective on Governance Structure Changes and Strategic Change

Jerry Goodstein and Warren Boeker

Relationship of Career Mentoring and Socioeconomic Origin to Managers' and Professionals' Early Career Progress

William Whitely, Thomas W. Dougherty, and George F. Dreher

Interpersonal Relations as a Context for the Effects of Appraisal Interviews on Performance and Satisfaction: A Longitudinal Study

Barry R. Nathan, Allan M. Mohrman, Jr., and John Milliman

Understanding Technology-Structure Relationships: Theory Development and Meta-Analytic Theory Testing

C. Chet Miller, William H. Glick, Yau-De Wang, and George P. Huber

Relationships Among Goal Difficulty, Business Strategies, and Performance on a Complex Management Simulation Task

Amelia A. Chesney and Edwin A. Locke

Research Notes

Effects of Work Redesign on Employee Perceptions, Attitudes, and Behaviors: A Long-Term Investigation

Ricky W. Griffin

Gains in Vertical Acquisitions and Market Power: Theory and Evidence

Sayan Chatterjee

Antecedents and Outcomes of Decision Speed in Different Environmental Contexts

William Q. Judge and Alex Miller

Attitudinal and Behavioral Effects of Autonomous Group Working: A Longitudinal Field Study

John L. Cordery, Walter S. Mueller, and Leigh M. Smith

ACADEMY OF MANAGEMENT

BOARD OF GOVERNORS

PRESIDENT	Janice M. Beyer, <i>University of Texas, Austin</i>
PRESIDENT-ELECT & PROFESSIONAL DIVISIONS COORDINATOR	Ramon J. Aldag, <i>University of Wisconsin, Madison</i>
VICE PRESIDENT & PROGRAM CHAIRPERSON	Donald C. Hambrick, <i>Columbia University</i>
SECRETARY-TREASURER & BUSINESS MANAGER	Ken Cooper, <i>Ohio Northern University</i>
PAST PRESIDENT	Steven Kerr, <i>University of Southern California</i>
EDITOR, ACADEMY OF MANAGEMENT EXECUTIVE	John P. Young, <i>University of Colorado, Denver</i>
EDITOR, ACADEMY OF MANAGEMENT JOURNAL	Michael A. Hitt, <i>Texas A&M University</i>
EDITOR, ACADEMY OF MANAGEMENT REVIEW	Richard J. Klimoski, <i>Ohio State University</i>
REPRESENTATIVES-AT-LARGE	Achilles A. Armenakis, <i>Auburn University</i> Richard A. Bettis, <i>Southern Methodist University</i> Allen Bluedorn, <i>University of Missouri</i> Richard L. Daft, <i>Vanderbilt University</i> Janet Fulk, <i>University of Southern California</i> Manuel E. London, <i>State University of New York at Stony Brook</i> Jeffrey A. Sonnenfeld, <i>Emory University</i>

CHAIRPERSONS OF PROFESSIONAL DIVISIONS

BUSINESS POLICY & PLANNING	Carl P. Zeithaml, <i>University of North Carolina</i>
CAREERS	Joseph Raelin, <i>Boston College</i>
ENTREPRENEURSHIP	Eugene G. Gomolka, <i>University of Dayton</i>
HEALTH CARE ADMINISTRATION	Cynthia Carter Haddock, <i>University of Alabama at Birmingham</i>
INTERNATIONAL MANAGEMENT	John D. Daniels, <i>Indiana University</i>
MANAGEMENT EDUCATION & DEVELOPMENT	Joseph Wolfe, <i>University of Tulsa</i>
MANAGEMENT HISTORY	Gary B. Roberts, <i>Kennesaw State College</i>
MANAGERIAL CONSULTATION	Laurie Larwood, <i>University of Nevada at Reno</i>
ORGANIZATION & MANAGEMENT THEORY	Kim Cameron, <i>University of Michigan</i>
ORGANIZATIONAL BEHAVIOR	Mary Ann Von Glinow, <i>University of Southern California</i>
ORGANIZATIONAL COMMUNICATION & INFORMATION SYSTEMS	William B. Snaveley, <i>Miami University</i>
ORGANIZATIONAL DEVELOPMENT & CHANGE	Robert E. Quinn, <i>University of Michigan</i>
PERSONNEL & HUMAN RESOURCES	Angelo S. DeNisi, <i>Rutgers University</i>
PRODUCTION/OPERATIONS MANAGEMENT	Roger Schroeder, <i>University of Minnesota</i>
PUBLIC SECTOR	John M. Bryson, <i>University of Minnesota</i>
RESEARCH METHODS	Lawrence R. James, <i>University of Tennessee</i>
SOCIAL ISSUES IN MANAGEMENT	Karen Paul, <i>Rochester Institute of Technology</i>
TECHNOLOGY & INNOVATION MANAGEMENT	Richard Goodman, <i>University of California, Los Angeles</i>
WOMEN IN MANAGEMENT	Barbara Gutek, <i>University of Arizona</i>

CHAIRPERSONS OF PROFESSIONAL INTEREST GROUPS

MANAGERIAL & ORGANIZATIONAL COGNITION	William H. Starbuck, <i>New York University</i>
POWER, NEGOTIATION, & CONFLICT MANAGEMENT	Linda L. Putnam, <i>Purdue University</i>

OTHER OPERATIONS

ACADEMY HISTORIAN & ARCHIVIST	Charles D. Wrege, <i>Rutgers University</i>
ACADEMY NEWSLETTER	D. Ray Bagby, <i>Baylor University</i>
ADVERTISING DIRECTOR	Donna Ledgerwood, <i>University of North Texas</i>
DIRECTOR OF COMPUTER SERVICES	Lee G. Caldwell, <i>Novell, Inc.</i>
DIRECTOR OF INTERNATIONAL PROGRAMS	Edwin L. Miller, <i>University of Michigan</i>
DIRECTOR OF MEMBERSHIP	Lucretia Coleman, <i>Georgia College</i>
MEDIA RELATIONS	Barbara Parker, <i>Florida Atlantic University</i>
PLACEMENT	Bruce H. Kemelgor, <i>University of Louisville</i>
PROCEEDINGS EDITORS	Lawrence R. Jauch, <i>Northeast Louisiana University</i> Jerry L. Wall, <i>Northeast Louisiana University</i>
PUBLISHER RELATIONS	Carl L. Swanson, <i>University of North Texas</i>
SIGMA IOTA EPSILON, STUDENT DIVISION	B. J. Hodge, <i>Florida State University</i>

Academy of Management JOURNAL

EDITOR	Michael A. Hitt, <i>Texas A&M University</i>
CONSULTING EDITORS	Susan J. Ashford, <i>Dartmouth College</i> Angelo S. DeNisi, <i>Rutgers University</i> Jane E. Dutton, <i>University of Michigan</i> Alan D. Meyer, <i>University of Oregon</i>
EDITORIAL BOARD	Everett E. Adam, Jr., <i>University of Missouri, Columbia</i> Phillip Anderson, <i>Cornell University</i> David B. Balkin, <i>University of Colorado</i> Jean M. Bartunek, <i>Boston College</i> Thomas S. Bateman, <i>University of North Carolina</i> Philip Bobko, <i>Rutgers University</i> Warren Boeker, <i>Columbia University</i> Philip Bromley, <i>University of Minnesota</i> Jennifer A. Chatman, <i>Northwestern University</i> Edward J. Conlon, <i>University of Iowa</i> Richard A. D'Aveni, <i>Dartmouth College</i> Gregory G. Dess, <i>University of Texas, Arlington</i> Robert Drazin, <i>Emory University</i> P. Christopher Earley, <i>University of Minnesota</i> Kathleen M. Eisenhardt, <i>Stanford University</i> John E. Ettlie, <i>University of Michigan</i> Gerald R. Ferris, <i>University of Illinois at Urbana-Champaign</i> Connie J. G. Gersick, <i>University of California at Los Angeles</i> Ricky W. Griffin, <i>Texas A&M University</i> Barbara A. Gutek, <i>University of Arizona</i> Charles W. L. Hill, <i>University of Washington</i> John R. Hollenbeck, <i>Michigan State University</i> Robert E. Hoskisson, <i>Texas A&M University</i> Barbara W. Keats, <i>Arizona State University</i> Steven J. Kobrin, <i>University of Pennsylvania</i> Barbara S. Lawrence, <i>University of California at Los Angeles</i> Thomas W. Lee, <i>University of Washington</i> Gregory B. Northcraft, <i>University of Arizona</i> Richard Osborn, <i>Wayne State University</i> Sara L. Rynes, <i>University of Iowa</i> Claudia B. Schoonhoven, <i>San Jose State University</i> Peter Sherer, <i>University of Pennsylvania</i> Stephen M. Shortell, <i>Northwestern University</i> Robert Sutton, <i>Stanford University</i> Anne S. Tsui, <i>University of California at Irvine</i> James P. Walsh, <i>Dartmouth College</i> Stuart A. Youngblood, <i>Texas A&M University</i>
BUSINESS MANAGER	Ken Cooper, <i>Ohio Northern University</i>
ADVERTISING DIRECTOR	Donna Ledgerwood, <i>University of North Texas</i>
COPY EDITOR	Persephone Dollner, <i>Ithaca, New York</i>
INDEX EDITOR	Margaret A. White, <i>Oklahoma State University</i>
PRODUCTION EDITOR	Steven Gomes, <i>Buffalo, New York</i>

INFORMATION FOR CONTRIBUTORS

The *Academy of Management Journal* publishes articles in fields of interest to members of the Academy of Management. These fields of interest are reflected in the divisions and interest groups listed on the inside front cover of the *Journal*.

AMJ publishes only original, empirical research as articles or research notes. The *Journal* does not publish purely theoretical articles; these are published by the *Academy of Management Review*. Papers that are primarily applied in focus and that have managers as an intended audience should be submitted to the *Academy of Management Executive*.

In its articles, the *Journal* seeks to publish research that develops, tests, or advances management theory and practice. Articles should have a well-articulated and strong theoretical foundation. All types of empirical methods—quantitative, qualitative, or combinations—are acceptable. Exploratory survey research lacking a strong theoretical foundation, methodological studies, replications or extensions of past research, and commentaries with new empirical content are also of interest for publication as research notes if they make an important contribution to knowledge relevant to management.

Articles and research notes should be written so they are understandable and interesting to all members of the Academy. The contributions of specialized research to general management theory and practice should be made evident. Specialized argot and jargon should be translated into terminology in general use within the fields of management. Articles should also be written as concisely as possible without sacrificing meaningfulness or clarity of presentation. To save space, tables should be combined and data should be presented in the text wherever possible.

Manuscripts submitted for publication as articles should not ordinarily exceed 30 double-spaced typewritten pages, including tables. Manuscripts submitted as research notes should not exceed 15 double-spaced typewritten pages, including tables. Everything in submitted manuscripts, including tables, should be typed in double-spaced format on one side of the page. Manuscripts prepared on computers should be printed on letter-quality printers or, if other printers are used, in double-strike or enhanced print.

Manuscripts are considered for publication with the understanding that their contents have not been published and are not under consideration elsewhere. Manuscripts should be prepared in accordance with the *AMJ Style Guide for Authors*, which is published in the March issue and is also available from the editor. Contributors should submit five copies of their papers, retaining the original for their files. The *Journal* does not return manuscripts unless requested to do so.

Decisions regarding publication of submitted manuscripts are based on the recommendation of members of the Editorial Board or other qualified reviewers. All articles and research notes published in the *Journal* are subject to a blind review process. Obvious self-citations that make known the author's identity should be avoided whenever possible. Reviewers evaluate manuscripts on their significance to the field, conceptual adequacy, technical adequacy, appropriateness of content, and clarity of presentation. Reviewers' comments are made available to authors.

Submissions should be sent to Professor Michael A. Hitt, *Academy of Management Journal*, College of Business Administration, Texas A&M University, College Station, Texas 77843-4221.

Academy of Management JOURNAL

CONTENTS

Volume 34, Number 2, June 1991

From the Editor	249
Self-Regulation for Managerial Effectiveness: The Role of Active Feedback Seeking Susan J. Ashford and Anne S. Tsui	251
Victims and Shareholders: The Dilemmas of Presenting Corporate Policy During a Crisis Alfred A. Marcus and Robert S. Goodman	281
Turbulence at the Top: A New Perspective on Governance Structure Changes and Strategic Change Jerry Goodstein and Warren Boeker	306
Relationship of Career Mentoring and Socioeconomic Origin to Managers' and Professionals' Early Career Progress William Whitely, Thomas W. Dougherty, and George F. Dreher	331
Interpersonal Relations as a Context for the Effects of Appraisal Interviews on Performance and Satisfaction: A Longitudinal Study Barry R. Nathan, Allan M. Mohrman, Jr., and John Milliman	352
Understanding Technology-Structure Relationships: Theory Development and Meta-Analytic Theory Testing C. Chet Miller, William H. Glick, Yau-De Wang, and George P. Huber	370
Relationships Among Goal Difficulty, Business Strategies, and Performance on a Complex Management Simulation Task Amelia A. Chesney and Edwin A. Locke	400

All articles in this issue were accepted during the editorship of Richard T. Mowday.

RESEARCH NOTES

- Effects of Work Redesign on Employee Perceptions, Attitudes, and Behaviors: A Long-Term Investigation
Ricky W. Griffin 425
- Gains in Vertical Acquisitions and Market Power: Theory and Evidence
Sayan Chatterjee 436
- Antecedents and Outcomes of Decision Speed in Different Environmental Contexts
William Q. Judge and Alex Miller 449
- Attitudinal and Behavioral Effects of Autonomous Group Working: A Longitudinal Field Study
John L. Cordery, Walter S. Mueller, and Leigh M. Smith. 464

The *Academy of Management Journal* (ISSN 0001-4273) is published by the Academy of Management four times a year in March, June, September, and December. The address of the office of publication is Academy of Management, P.O. Box 39, 300 South Union St., Ada, Ohio 45810.

Subscription rates for U.S., Mexico, and Canada: \$38 for one year, \$70 for two years, \$96 for three years. Rates for overseas: \$42 for one year, \$78 for two years, \$108 for three years. All payable in U.S. dollars. Subscriptions and orders for back issues should be sent to the Business Manager, Ken Cooper, P.O. Box 39, 300 South Union St., Ada, Ohio 45810.

Manuscripts and other material of an editorial nature should be sent to Michael A. Hitt, Editor, *Academy of Management Journal*, College of Business Administration, Texas A&M University, College Station, Texas 77843-4221.

Copies of articles published in the *Journal* may be made for instructional, non-commercial use. The Academy of Management does not require prior clearance and makes no charge for this permission.

Inquiries related to advertising should be addressed to Donna Ledgerwood, College of Business Administration, University of North Texas, Denton, Texas 76203.

Typesetting, presswork, binding, and mailing by The Sheridan Press, Hanover, Pennsylvania.
Academy of Management Journal, Publication No. 900920.

Second class postage paid at Ada, Ohio, and additional mailing offices.

POSTMASTER—Send address changes to *Academy of Management Journal*, P.O. Box 39, 300 South Union St., Ada, Ohio 45810.

ISSN, 0001-4273

FROM THE EDITOR

In his last official act as editor of *AMJ*, Rick Mowday compiled the final statistics on the disposition of all manuscripts submitted during his three-year term. Below is a listing of those statistics.

M.A.H.

REPORT TO READERS

The final statistics regarding manuscripts submitted during my term as editor were not available in time to be included in the March issue. A summary of the final disposition of all papers processed between July 15, 1987, and December 31, 1990, appears below.

Status	Number	Percent of Total
Accepted for publication	114	8%
Rejected after review	1,016	72%
Returned without review	178	13%
Under revision	58	4%
Withdrawn from <i>AMJ</i>	33	2%
Decision pending	3	1%
Totals	1,402	100%

The category "under revision" includes papers on which a revision was invited but that had not yet been resubmitted by the end of my term. Some of these papers will be accepted for publication by Michael Hitt. In addition to the number of papers accepted for publication noted above, I published seven papers initially submitted during the term of my predecessor, Janice Beyer.

Richard T. Mowday

PAST EDITORS

Paul M. Dauten, Jr., <i>University of Illinois</i>	1958–60
Dalton E. McFarland, <i>Michigan State University</i>	1961–63
Paul J. Gordon, <i>Indiana University</i>	1964–66
Stanley C. Vance, <i>University of Oregon</i>	1967–69
William G. Scott, <i>University of Washington</i>	1970–72
John B. Miner, <i>Georgia State University</i>	1973–75
Larry L. Cummings, <i>University of Wisconsin–Madison</i>	1976–78
John W. Slocum, Jr., <i>Southern Methodist University</i>	1979–81
Thomas A. Mahoney, <i>Vanderbilt University</i>	1982–84
Janice M. Beyer, <i>New York University</i>	1985–87
Richard T. Mowday, <i>University of Oregon</i>	1988–90

SELF-REGULATION FOR MANAGERIAL EFFECTIVENESS: THE ROLE OF ACTIVE FEEDBACK SEEKING

SUSAN J. ASHFORD

Dartmouth College

ANNE S. TSUI

University of California, Irvine

This field study examined the feedback-seeking behavior of 387 managers as observed by their superiors, subordinates, and peers. Results suggest that managers' tendency to seek negative feedback increased the accuracy of their understanding about how these feedback sources evaluated their work. Seeking negative feedback further enhanced the three constituencies' opinions of the managers' overall effectiveness. Seeking positive feedback, in contrast, decreased constituents' opinions of the managers' effectiveness. Such results demonstrate the importance of both instrumental and impression-management concerns in the feedback-seeking process and support the proposition that active feedback seeking is a central part of a total process of self-regulation for managerial effectiveness.

Feedback plays an important role in individual behavior and performance. Feedback has long been known to increase performance by both motivating individuals and directing them to correct performance strategies (cf. Ammons, 1956; Vroom, 1964). Although feedback has been studied extensively because of its effects on individual task performers, it has received little attention in the managerial effectiveness literature. Given the inherent ambiguities of managerial work, however, feedback from sources such as superiors, peers, and subordinates may play an important role in an individual's ability to be an effective manager. Feedback can provide managers with an accurate sense of how these sources perceive and evaluate their work; it also can provide guidance about strategies that could enhance their effectiveness.

This research invoked a self-regulation perspective on managerial behavior to justify the importance that active feedback-seeking behavior can have for managerial effectiveness. In this perspective, managers are viewed

As we contributed equally to this project, authorship is listed alphabetically. Our thanks to Gregory Northcraft and James P. Walsh for their valuable comments on an earlier draft. We also thank the Fuqua School of Business, Duke University, for providing partial computer support for this project. We are most indebted to Blair Sheppard for providing the opportunity to participate in the project that was the source of the data for this study.

as active agents who manage their performance environments, including the solicitation of feedback from those who are important parts of their social structures.

THE SELF-REGULATION PROCESS

Theoretical Background

As stated, managerial work is complex and ambiguous (Katz & Kahn, 1978; Lombardo & McCall, 1982), and this ambiguity intensifies as managers move up an organizational hierarchy (Jaques, 1961). Many factors contribute to this complexity and ambiguity, including the variety of roles that are relevant to a manager's job (e.g., Mintzberg, 1973), the presence of multiple constituencies, or stakeholders, in the manager's social structure (Morse & Wagner, 1978; Salancik, Calder, Rowland, Leblebici, & Conway, 1975; Tsui, 1984a), and the organizations' frequent reliance on the subjective judgments of its members when assessing managerial performance. The complexity makes it difficult to specify precisely what managers should do at any point in time. Consequently, such traditional control mechanisms as job descriptions, standard operating procedures, and formal performance appraisal systems may only loosely control managers. Because organizational systems cannot be used to completely regulate managers, those who run organizations are dependent upon managers' self-regulatory activities in order to achieve control and coordinated action.

For managers, self-regulation does not occur in a vacuum; many parties have an interest or stake in managers' actions and decisions. Thus, the self-regulation process described here is broader and more complicated than similar processes that previous research has discussed under the rubric of self-management (cf. Luthans & Davis, 1979; Manz & Sims, 1980). Self-management research generally has been focused on the controlling of discrete, specific, objectively measurable behaviors (e.g., getting to meetings on time or filling out expense reports) in situations in which the only evaluation that matters is that of the individual whose behavior is being self-controlled. In such situations, managers usually observe their own behaviors, compare them to self-set goals, and either change their behaviors or reward themselves. Self-regulation in managerial contexts involves controlling broader phenomena or behaviors, such as style, accessibility, and leadership. Further, an organization's assessment of a manager's effectiveness often relies, at least in part, on others' subjective judgments (Mills, 1983). Consequently, self-regulation that is precipitated solely from managers' own observations of their behavior is not sufficient for attaining effectiveness. Managers must also understand and incorporate others' subjective judgments, which are usually informal and subtle, in their self-regulation efforts. These requirements suggest that there is a different, more interpersonal, self-regulation at work than that which is normally considered in the self-management literature (cf. Luthans & Davis, 1979; Manz & Sims, 1980).

Our concept of self-regulation is grounded in a control theory frame-

work (Carver & Scheier, 1981). In this framework, managers adopt standards, test their behaviors against those standards using information sensed from the environment, and take actions to reduce any detected discrepancies. The managers' regulatory objective is to minimize the discrepancy between standards and "enacted" behaviors (behaviors undertaken to attain a goal) (Lord & Hanges, 1987). Accordingly, the process of self-regulation involves at least three subprocesses: standard setting, discrepancy detecting, and discrepancy reducing. To carry out standard setting and discrepancy detecting in ways that account for the needs and goals of others in a social structure, managers must search for information and feedback from social sources such as superiors, subordinates, and peers, all of whom are important constituencies for managers (Tsui, 1984a). This self-regulation approach is consistent with Kenny and Zaccaro's (1983) proposal that the ability to perceive the needs and goals of various constituencies may be an important predictor of managerial effectiveness.

Once goals have been established, managers can either use available feedback or seek additional feedback to assess how others are perceiving their behavior. This search often yields information that allows managers to assess the discrepancy between their behavior and standards. Thus, seeking feedback is the essence of the discrepancy-detection subprocess. Once detected, a discrepancy activates the discrepancy-reduction process, a process that could involve possible adjustments in behavior or standards. Hence, because feedback seeking allows a manager to detect discrepancies and subsequently to correct behaviors, it may be the most central aspect of the self-regulation framework. Although it is the three subprocesses in total that facilitate the attainment of managerial effectiveness, the current research focused specifically on the role of active feedback seeking in managerial effectiveness.

Feedback Dynamics in Self-Regulation

Managers may receive feedback in many ways and from many sources. They may receive it directly (cf. Ilgen, Fisher, & Taylor, 1979), or solicit it (Ashford & Cummings, 1983), or infer it from a variety of informal cues (Ashford & Cummings, 1983; Herold & Parsons, 1985). Although some feedback may be inherent in a task itself, much feedback comes from such sources as superiors, peers, and subordinates (Herold & Parsons, 1985). Spontaneous feedback from such social sources is, however, often constricted (Felson, 1980; Fisher, 1979; Tesser & Rosen, 1975). This reality implies that active feedback seeking may be essential if managers are to attain information about these constituents' evaluations of their work. Ashford and Cummings (1983) argued that in a world in which spontaneously provided feedback is somewhat constrained, individuals who seek feedback actively should perform better in their jobs than will others because active seekers will have more insight into where their behavior is off track with respect to the goals they are pursuing.

But feedback seeking is far from a straightforward process. Both the type

of feedback sought and the method used to seek it may affect the quality or the accuracy of the information acquired. The different power and structural relationships between managers and each constituency that might be a feedback source further complicates the process. These observations underlie the hypotheses tested in this research.

Influence of feedback type. Feedback can be positive or negative. Either type is evaluative information that directly references the self, and thus it is inherently affective (Ashford & Cummings, 1983). This observation suggests that individuals may not behave rationally in feedback seeking. They may seek one type of feedback and avoid the other even if this seeking pattern hurts their performance. In particular, individuals may avoid seeking negative feedback because they see it as ego-threatening (Janis & Mann, 1977; Miller, 1976) or because they believe that seeking feedback may make their weaknesses much more salient than they had been to the source from which they seek feedback. The empirical evidence regarding this issue is equivocal. Trope and his colleagues (cf. Trope, 1975, 1982; Trope & Bassock, 1982; Trope & Ben-Yair, 1982) showed that individuals sought and actually preferred negative (diagnostic) feedback, but Swann and his colleagues (cf. Swann & Ely, 1984; Swann & Read, 1981) showed that individuals did just the opposite. Past evidence on this issue, though, has been collected in laboratories, where there were no particular sanctions if individuals misjudged their abilities and no particular benefits if they developed accurate assessments. In organizations, however, avoiding negative feedback can be costly. To be effective and, indeed, to simply survive in organizations, managers must understand the ineffective actions they take so that they can correct them. They need to develop an accurate view of how they are being perceived.

Research has suggested that individuals tend to have inaccurate—specifically, overinflated—views of their own behavior (see Mabe and West, 1982, for a review). This inaccuracy may occur because individuals are more likely to give each other positive feedback spontaneously and withhold negative appraisals (Larson, 1986; Tesser & Rosen, 1975). Further, when people do give negative feedback, they are likely to distort it in a positive direction (Fisher, 1979; Ilgen & Knowlton, 1980). Given these tendencies, individuals are unlikely to receive spontaneous negative feedback from others, which suggests that it is especially important for them to seek such information actively. Individuals who overcome the psychological threat and explicitly and actively seek negative feedback should have a more tempered view of their abilities, their performance, and their standing in an organization than those who do not do so. They also will have a better basis from which to take corrective actions.

Clearly, positive feedback also has information value. It describes what a person does well so that such behavior can be repeated. However, if people frequently receive spontaneous positive feedback (Larson, 1986; Tesser & Rosen, 1975), seeking it actively is not likely to yield much new information. Consequently, explicitly seeking positive feedback may have no effect on the

accuracy of a manager's understanding of constituents' evaluations. The following hypothesis is based on the comparative information value of positive and negative feedback.

Hypothesis 1: The tendency to seek negative feedback will be positively associated with accurate knowledge of constituencies' evaluations, whereas the tendency to seek positive feedback will not be associated with such accuracy.

Even though feedback seeking may allow managers to obtain valuable information, it is not without potential costs (Ashford, 1986; Ashford & Cummings, 1983). These costs lie in the impressions that the act of seeking may convey. Feedback seeking can result in either a positive or a negative impression. Some may see this behavior as a sign of weakness and a need for reassurance, whereas others may see it as a sign of strength, denoting that the seeker is eager to take on and overcome weaknesses. The interpretation others make will depend, among other things, on the type of feedback that is sought. If managers seek positive feedback, it may signal an underlying insecurity and a need for reassurance. Observers may question the seekers' self-confidence and reduce their opinions of the seekers' overall effectiveness. Seeking negative feedback, on the other hand, may convey an image of the seekers as eager to perform well and interested in improving their behavior, thereby enhancing the favorableness of others' overall opinions. Hence, in addition to its ability to generate valuable information, feedback seeking can also have impression management implications.

Hypothesis 2: The tendency to seek negative feedback will be positively associated with constituencies' opinions of a manager's overall effectiveness, whereas the tendency to seek positive feedback will be negatively associated with this opinion.

In this self-regulation framework, positive and negative feedback are conceived to be two independent sets of information that may be of interest to self-regulators. Some may seek both types of feedback in equal amounts or equally often, whereas others may seek one type more than the other type. Hypotheses 1 and 2 specify the relative effect that the tendency to seek each of the two types of feedback will have on accuracy and effectiveness. Thus, these hypotheses treat the two as separate and independent variables rather than as a variable spanning two ends of a continuum.

Influence of feedback-seeking strategy. Awareness of the impression management implications of feedback seeking may deter some managers from seeking feedback entirely and may alter others' seeking strategies. Individuals can seek feedback using either a direct inquiry strategy or an indirect observation, or monitoring, strategy (Ashford & Cummings, 1983). Ashford (1986) found that employees with long company tenure were less inclined to seek feedback by inquiry than were relative newcomers. She interpreted this result as reflecting an inhibitory self-presentational pressure faced by employees at senior levels. Similarly, Northcraft and Ashford

(1990), in a laboratory study, found that having to seek feedback in public deterred individuals from asking for it directly. Thus, although inquiry could convey a positive impression, these studies suggest that using inquiry to seek feedback entails impression management costs.

Faced with potential impression management costs but still hoping to obtain feedback, managers might reduce their inquiry and instead attend to indirect cues, or use a monitoring strategy. When managers curtail inquiry, they can avoid the potential social cost of being viewed as weak or insecure. However, there is a trade-off. The messages inferred from the often subtle cues picked up by monitoring may require a great deal of inference, and thus they may be subject to a variety of interpretation biases (Ashford, 1989; Ashford & Cummings, 1983). Therefore, managers who rely solely on monitoring may have less accurate information than those who use inquiry (Ashford & Cummings, 1983). In short, inquiry yields information that is easily interpretable, but it conveys an impression of insecurity. In contrast, monitoring insulates a manager from impression management concerns but puts the manager in the position of having to draw inferences from subtle and often ambiguous cues. The following two hypotheses are based on the information gain and impression management costs of using inquiry as opposed to monitoring as a feedback-seeking strategy.

Hypothesis 3: The tendency to use feedback inquiry will be positively associated with accurate knowledge of constituencies' evaluations, whereas the tendency to use feedback monitoring will be negatively related to such accuracy.

Hypothesis 4: The tendency to use feedback inquiry will be negatively associated with constituencies' opinions of a manager's overall effectiveness, whereas the tendency to use feedback monitoring will have no association with effectiveness opinions.

These two hypotheses are general predictions regarding the effects of feedback-seeking strategies. In fact, in Hypotheses 1 through 4 we treated feedback type and feedback strategies as having independent, additive effects on the two outcome variables. However, these two sets of feedback variables are most likely correlated because any act of feedback seeking will involve choices about both type and strategy. An individual can inquire for either positive or negative feedback and can also monitor indirect cues regarding either or both types of feedback. Given such correlation of type and strategy, we considered the two sets of feedback variables simultaneously in estimating their effects on accuracy and effectiveness.

Finally, in estimating the impression management effects postulated in Hypotheses 2 and 4, an analysis should control for the accuracy of managers' knowledge of others' evaluations. This control is important because the self-regulation framework used here suggests that accuracy is an important predictor of effectiveness. Hypotheses 3 and 4 posit that the effects of impres-

sion management costs or benefits on feedback seeking are independent of the effects of the accuracy of a manager's knowledge of others' evaluations or opinions.

Influence of feedback sources. To this point, we have implied that managers are motivated to seek feedback from superiors, subordinates, and peers. However, managers may not treat all feedback sources equally. They may seek different types of feedback from and use different strategies with different sources. To date, the targets or sources of active feedback search have received little attention in the feedback literature. Although scholars have shown that different sources provide different amounts of feedback (Greller & Herold, 1975; Hanser & Muchinsky, 1978; Herold & Parsons, 1985), no research has directly examined preference in source selection and patterns of feedback seeking across different sources. Given the current state of the literature on this issue, the hypotheses on feedback sources presented below are exploratory.

A variety of idiosyncratic factors can affect a feedback seeker's selection of a source. O'Reilly's (1977) work on information acquisition, for example, showed that the supportiveness of a source affected how frequently it was used. O'Reilly (1983) further suggested that factors such as the accessibility of the source, its credibility, and the potential affective sign of the information that is being sought should all affect the selection of the source.

The relevance of these idiosyncratic factors will vary among different sources and among different feedback seekers. One systematic factor is the power-dependence relationship between a manager seeking feedback and such sources as superiors, subordinates, and peers (Eder & Fedor, 1989). Previous research, has suggested, for example, that the degree to which managers depend on others causes them to alter their influence styles or tactics (Kale, 1989; Kipnis & Schmidt, 1988). We posited that differences in dependence may also influence patterns of feedback seeking.

Even though managers depend on their peers and subordinates to varying degrees, all managers depend on their superiors for resources (e.g., budget) and rewards (e.g., salary increases and promotions). Because of this strong dependence on their superiors, managers may be especially motivated to seek feedback from this source. Such feedback seeking should yield information that allows managers to understand their superiors' goals, expectations, and ongoing evaluations of the managers. This understanding should contribute to a high perceived effectiveness, at least with superiors.

Managers may be less motivated to seek feedback from their peers and subordinates both because of the lower perceived informational value of feedback from these sources and the potentially higher impression management costs. Because managers are superiors to their subordinates, the managers are supposed to know what roles they should perform and how well they are performing. Seeking feedback from subordinates may detract from an image of strength and confidence. Managers also may be hesitant to seek feedback from peers because of a concern that their peers might perceive them as lacking confidence and self-assurance. Even though similar con-

cerns may be present when managers ask for feedback from their bosses, the value of the information that may be obtained from superiors counterbalances such fears. Thus, although the actual value of feedback may be equivalent across sources, managers perceive a greater information value in superiors' feedback. This greater value counterbalances impression management concerns. With peers and subordinates, the perceived information value is less and so impression management concerns may dominate, resulting in reduced seeking. Thus, in general,

Hypothesis 5: Managers will be more active in seeking feedback, using both inquiry and monitoring, from superiors than from subordinates and peers.

In addition to engaging in different levels of feedback seeking with different sources, managers also may seek different types of feedback from different sources. Managers should desire both negative and positive feedback from their superiors. Negative feedback from superiors is important because from it managers are able to correct their performance, whereas positive feedback is important for enhancing their confidence and ensuring future rewards. Even though seeking negative feedback from a superior may include a potential cost—it may expose a weakness or crystallize a previously hazy negative impression of the seeker—the value of the information to be gained may neutralize concerns about the potential impression management costs. Further, although Hypothesis 2 suggests a social cost of seeking positive feedback, subordinates may be somewhat immune to this cost when seeking positive feedback from superiors because seeking feedback and asking for help in general is congruent with the subordinate role. Thus, any particular subordinate's seeking may not be seen as especially indicative of an underlying state like insecurity. Subordinates may be able to get away with seeking both positive and negative feedback from superiors.

In contrast, with subordinates and peers, on whom a manager is less dependent than on superiors, the pattern of seeking may be different. Impression management concerns may influence feedback seeking more than the perceived value of the information to be obtained. Specifically, managers often compete with peers for rewards and resources. Peers also tend to be closer in age to each other and to serve as a social reference group. Both of these realities motivate managers to maintain a favorable image in front of their peers. They may seek to enhance their public image of effectiveness among peers and especially to avoid disclosing weaknesses. Therefore, although managers may be reluctant to seek feedback from peers in general, should they decide to seek feedback from this source, they may tend to seek—or even to subtly publicize—positive feedback more than negative feedback.

Why would managers not take the impression management cost of seeking positive feedback (Hypothesis 2) into account when using peers as a feedback source? We posited that the competitive pressure to present a favorable public image among peers is strong enough that managers are willing to incur the cost of being seen as interested in ego-enhancing information

rather than expose potentially career-damaging negative information about themselves. Managers may believe that, overall, their interests are best served by avoiding discussion of their negative performance with peer competitors for career opportunities and other rewards. Such avoidance clearly is a departure from the rational behavior proposed in Hypothesis 2, and this departure will most likely be costly to managers in terms of peers' perceptions of their effectiveness. Consequently, of the three constituencies, we expected peers to have the least favorable opinion of managers, given the latter's general reluctance to use peers as a feedback source and tendency to prefer positive feedback from this source over negative feedback.

Regarding subordinates, the opposite may occur. Though managers may be less inclined to seek feedback from subordinates than from others, they may seek it if they think such behavior would convey an image of responsiveness, caring, and interest. This motive may lead managers to seek negative, rather than positive, feedback from subordinates. These postulations, albeit tentative, are the bases for the following hypotheses relating feedback types to feedback sources:

Hypothesis 6a: Managers will seek more feedback, both positive and negative, from superiors than from peers and subordinates.

Hypothesis 6b: Managers will seek more positive than negative feedback from their peers.

Hypothesis 6c: Managers will seek more negative than positive feedback from their subordinates.

In summary, we propose that active feedback seeking is an important step in the self-regulation process by which managers monitor the opinions of multiple constituencies and facilitate their effectiveness. Active feedback seeking should improve managers' accurate knowledge about constituency expectations and evaluations. Both the type of feedback sought and the seeking strategy used will affect the degree of that accuracy. In addition, as managers seek feedback from different sources, both seeking strategy and the type of feedback sought will vary with the power-dependence relations involved and the perceived impression management benefits or costs.

METHODS

Sample

The population for this study was composed of mid-level executives who held positions as directors of functional units such as operations, support services, finance, marketing, and human resources in a public service agency. Also included in the study were these directors' superiors, subordinates, and peers. The final group was composed of 387 executives, representing a 77 percent response rate, and 2,447 constituents—345 superiors (87% response rate), 1,056 peers (91% response rate), and 1,046 subordinates (90% response rate). The functional unit directors were the focal managers

whose feedback-seeking behaviors, role performance, and overall effectiveness this study measured.

The public service agency was organized into five semiautonomous geographical regions in which 74 divisions operated. The work and the performance goals of these divisions were essentially identical. A regional general manager who supervised a number of divisions headed each region. Divisional general managers, the superiors in this study, and seven functional unit directors—the focal managers and the peers in this study—managed each division. The outputs of each division were highly objective and clearly measurable. The organization measured each functional unit director on a number of clear, objective performance goals and indicators. Most of these indicators measured the performance of an entire division, though specific directors were more directly responsible for some indicators than others. For example, the performance measures for a human resource director could include the number of employee grievances that arose and the rates of employee absenteeism, accidents, and affirmative action hires and promotions. A report was generated every four weeks showing the performance of each division as a whole as well as the performance of each unit director's area. This report was given to all the directors. In general, the organizational context can be characterized as having a highly formalized performance measurement system with extensive measures taken on both the production process and outputs. Further, formal communication among the functional directors was quite frequent, and knowledge of each others' responsibilities was quite thorough. These directors varied, however, in their informal feedback exchanges and in their active feedback-seeking behavior with those who ranked above them, below them, and at the same level.

Procedures

The focal managers were first asked to provide a list of the people they interacted with most frequently in their jobs via the following instruction: "Below please put down the names and addresses of (a) your immediate superior, (b) seven of your subordinates (i.e., those who report to you), and (c) five of your peers (i.e., the other unit directors). Please list those with whom you have the most regular and frequent work-related interactions." No additional instruction was given on the order in which these people should be listed. Presumably, the focal managers listed the names of those who came to mind first. One of the researchers randomly picked three names each from the subordinate and the peer lists,¹ and sent a coded survey to each of these seven individuals—the superior, three peers, and three subordinates. Confidentiality of their responses was assured. The focal manager

¹ To randomly select from the seven subordinates listed, we wrote the numbers ranging 1 to 7 on separate pieces of paper, put them into an envelope, and randomly drew three. The same procedure was used in randomly drawing three peers from the list of five.

also completed an instrument containing measures designed for this research. All completed instruments were returned directly to the researcher at her university.

Table 1 provides a summary of the demographic characteristics of the focal managers and each of the three constituencies. On the average, the focal managers were 46 years old, had 26 years of full-time work experience, and had been with the agency for 21 years. Focal managers had held their current jobs for a little less than two years. The profiles of the focal managers and their peers were highly similar, which was expected since these two groups were at the same organizational level. Also as expected, the superiors were usually men who were older and had longer company tenure than the members of the other three groups. Relative to the other three groups, the subordinates were younger and had shorter company tenure, and more of them were women.

TABLE 1
Demographic Characteristics of the Sample

Demographic Variables ^a	Focal Managers	Superiors	Peers	Subordinates
Gender				
Men	87	93	89	79
Women	13	7	11	21
Race				
White	76	73	79	77
Minority	24	27	21	23
Education				
High school	3	5	4	9
Some college	39	31	38	53
B.A. or B.S.	15	6	16	19
Graduate courses	19	41	20	12
M.A. or M.S.	20	18	21	6
Doctorate courses	2	0	1	1
Doctorate	2	0	1	1
Age				
Mean	46.0	51.2	46.2	44.5
s.d.	6.7	7.8	6.9	7.8
Years of full-time work experience				
Mean	25.9	31.0	26.2	24.5
s.d.	7.5	8.3	7.3	8.6
Company tenure				
Mean	21.4	27.4	21.6	19.7
s.d.	6.7	8.4	6.8	8.2
Job tenure				
Mean	1.9	2.6	2.0	2.9
s.d.	1.4	2.5	1.7	3.2

^a Statistics shown are percentages. The sample sizes were 387 for focal managers, 345 for superiors, 1,056 for peers, and 1,046 for subordinates.

Measures

Dependent variables. The first dependent measure was the accuracy of the focal managers' knowledge about constituency evaluations of their role performance. To measure accuracy, we adopted a procedure used in performance appraisal research (Cardy, 1982; Cardy & Dobbins, 1986) and in previous role accuracy research (Greene, 1972; Greene & Organ, 1973) and based on the *D*-statistic developed by Cronbach and Gleser (1953). The basic procedure involves comparing the scores obtained from a focal manager to the scores obtained directly from a constituency, with the latter treated as the true score. The sum of the squared differences between the two sets of scores measures the extent to which a focal manager was inaccurate in his or her knowledge of the constituency's evaluations of a set of stimulus items.²

The stimulus items used in this research were Mintzberg's (1973) ten managerial roles. The focal managers received the list of roles, each described by a brief paragraph. They were asked to rate, on a seven-point scale ranging from 1, "not at all effective," to 7, "extremely effective," how they thought their superiors, their subordinates, and their peers would each rate their effectiveness in performing each role. We also obtained the constituents' actual ratings of the focal managers, using the same role descriptions and identical scoring anchors. The accuracy score for each constituent was derived by the following formula:

$$\text{Accuracy}_j = 360 - \sum_{i=1}^{10} (FC_i - C_{ij})^2,$$

where

FC_i = a focal manager's (*F*) estimated rating with respect to each constituency (*C* = superior, subordinate, or peer) for each managerial role (*i* = 1 to 10),

C_{ij} = the actual rating on each role (*i*) by each constituent (*j*) in each constituency (*c*),

and

360 = the maximum score if the focal manager's ratings were completely inaccurate with respect to a constituent.

A separate accuracy score was obtained for each constituent. We then

² We considered the various alternatives to difference scores suggested by Johns (1981) and decided that, given the nature of the phenomenon under investigation, difference scores were the most meaningful approach in measuring accuracy. Their use was also consistent with practices in previous research (Greene & Organ, 1973). Following Johns, we computed reliability estimates for both the component scores and the difference scores. The alpha coefficients for the components ranged from .81 to .92, with a mean of .88. The alphas for the difference scores ranged from .74 to .81, with a mean of .78. This level of reliability for the accuracy scores appeared highly acceptable.

reversed the accuracy score by subtracting it from 360 so that a large score denoted a high level of accuracy.

The second dependent variable was the constituents' judgments of the focal managers' overall effectiveness, measured with the reputational effectiveness scale developed by Tsui (1984b). This three-item summary scale measured the extent to which focal managers had met constituents' performance expectations. The alpha coefficient of this scale was .91 for superiors, .89 for subordinates, and .90 for peers.

Independent variables. Two sets of independent variables were involved: (1) feedback type, or sign, which captured each focal manager's tendency to seek negative or positive feedback, and (2) feedback-seeking strategy, measuring a focal manager's tendency to use inquiry or monitoring in seeking feedback.

Based on preliminary interviews and two pilot tests using fully employed executive M.B.A. students, we developed three items to measure the tendency to seek negative feedback (e.g., "how characteristic was it of this executive to prefer detailed, critical appraisals even though they might hurt") and three items to measure the tendency to seek positive feedback (e.g., "how characteristic was it of this executive to tend to seek good news about himself or herself"). The constituents were asked to use a five-point scale to indicate how characteristic the behavior each item described had been during "the past six months."³ We chose the six-month time frame because it was consistent with previous research using behavioral recall (Kipnis, Schmidt, & Wilkinson, 1980).

Items measuring feedback-seeking strategies were adopted from Ashford (1986). Inquiry was measured by five items and monitoring by nine items. The constituents were asked to indicate, also on a five-point scale, how frequently a focal manager used each method to obtain feedback from others during the six-month period.

Factor analyses were performed on the feedback items to define a set of measures with the highest levels of construct validity and internal consistency reliabilities. This was done by splitting the sample of 2,447 constituents into two approximately equal, random subsamples, treating one subsample as the developmental group, and using the second for validation of the factor structures identified. First, we performed a principal components factor analysis with oblique rotation on the data from the developmental subsample, using oblique rotation because of the assumed correlations among the feedback variables. For the feedback type items, as expected, a scree test indicated that two factors were most meaningful, accounting for 77.4 percent of the total variance. However, only two items loaded mean-

³ For three reasons, we deemed self-reports of feedback seeking less acceptable than reports provided by constituents. First, people may not be able to verbalize their mental processes accurately (Nisbett & Wilson, 1977). Second, espoused actions may depart from real actions (Argyris & Schon, 1974). Third, these feedback items might elicit socially desirable responses. Thus, constituents were asked to describe the behaviors of the managers.

ingfully on each factor. The loadings were above .85 on each factor, with no high cross loadings. Thus, we retained these four items and confirmed the factor structure using a LISREL confirmatory factor analysis on the validation subsample. The results showed a goodness-of-fit index of 1.00 and a clean and unambiguous factor structure. Table 2 shows the factor-loading pattern based on the LISREL factor analysis performed on the validation subsample. The alpha coefficients for negative feedback and positive feedback factors were .70 and .72, respectively.

The feedback-seeking strategy items were factor-analyzed using a similar procedure. However, the scree plot suggested that a three-factor solution

TABLE 2
Confirmatory Factor Analysis Results

(a) Feedback Type	Negative Feedback	Positive Feedback	Goodness of Fit
"Thinking about the past 6 months, how characteristic was it of this executive to:			1.00
1. Ask others to be critical when they gave him or her feedback	.62		
2. Prefer detailed, critical appraisals even though they might hurt	.91		
3. Tend to seek good news about himself or herself		.77	
4. Ask for feedback if he or she knew it would be positive rather than negative"		.68	
Cronbach's alpha	.70	.72	

(b) Feedback-Seeking Strategy	Inquiry	Direct Cue Monitoring	Indirect Cue Monitoring	Goodness of Fit
"During the past 6 months, to obtain feedback, how frequently did this executive:				0.97
1. Directly ask for information concerning his or her performance	.89			
2. Directly ask you, 'how am I doing?'	.78			
3. Directly ask for an informal appraisal	.69			
4. Observe how quickly you returned his or her phone calls			.83	
5. Observe how often you went to him or her for advice			.69	
6. Observe how long he or she was kept waiting when you and this manager had a set appointment			.70	
7. Pay attention to how you acted toward him or her		.74		
8. Pay attention to informal, unsolicited feedback		.69		
9. Pay attention to casual remarks you made"		.68		
Cronbach's alpha	.83	.75	.75	

accounting for 70.2 percent of the total variance was most meaningful. Three items loaded highly (above .75) on each factor with no cross-loadings. Two separate factors emerged from the items defining the monitoring strategy. The factor correlation between these two monitoring factors was .23. Therefore, we retained three factors. LISREL confirmatory factor analysis using the validation subsample also confirmed this three-factor structure, with a goodness-of-fit index of .97 ($\alpha_s = .83, .75, \text{ and } .75$). On the basis of the item descriptions, we labeled the three factors (1) inquiry (e.g., "During the past six months, how frequently did this executive directly ask you 'how am I doing?' "); (2) direct cue monitoring (e.g., "pay attention to informal, unsolicited feedback"); and (3) indirect cue monitoring (e.g., "observe how quickly you returned his or her phone calls"). The items loading on the indirect cue-monitoring factor constituted cues that seemed to require more inference as to the meaning of the feedback message than did direct cues.⁴

Analyses

In the hypotheses, we assumed that managers would engage in fairly similar behavior toward all subordinates as a group—or constituency—and likewise would behave consistently toward peers as a separate group. The assumption of within-constituency agreement needed to be verified before we aggregated or pooled the data from each focal manager's three subordinates or the three peers. We thus performed a Chow test (Greene, 1990) on the three subordinates' regression models and a separate one on the three peers' regression models. We performed these tests using both the accuracy scores and the effectiveness ratings as dependent variables and the five feedback-seeking variables as the predictor variables. The values of F comparing the sum of squares of errors in the full models (for example, the three regression equations for the three subordinates) and in the restricted models (the three subordinates' data pooled) were nonsignificant for both outcome variables. These results mean that the relationship of the feedback-seeking variables to accuracy and effectiveness was similar among the three subordinates. Similar results were obtained on the peers' models. Therefore, in all the analyses related to the hypotheses, we treated the three subordinates as one group and the three peers as another group.

Next, we computed the means, standard deviations, and intercorrelations among all the variables in the study separately for each of the three

⁴ To test whether job-level differences might affect the factor structures of these feedback items, we performed additional factor analyses, one for each of the seven constituents and one for each of the three sources. The factor structures and factor loadings were highly similar—indeed, nearly identical—among all of these subsamples. A final set of factor analyses was performed on the total sample as well as on subsets of samples, including all 13 feedback items and the three overall effectiveness items. This process confirmed a six-factor solution with clear loadings, a result strongly suggesting that the five feedback variables and the overall effectiveness measure are independent constructs.

constituencies.⁵ The multiple regression procedure was used for testing Hypotheses 1 through 4. For Hypotheses 2 and 4, we included the accuracy score in the equation as a control variable. One-way analysis of variance (ANOVA) and correlated t-tests were used to test Hypotheses 5 and 6, with constituency as the classification variable.

RESULTS

Table 3 shows the intercorrelation matrixes. The correlational patterns appeared to be quite similar among the three feedback sources. Specifically, the following significant relationships emerged for all three groups: (1) the accuracy score was positively associated with the overall effectiveness rating (average $r = .46$), (2) the tendency to seek negative feedback was negatively correlated with the tendency to seek positive feedback (average $r = -.25$); (3) the tendency to seek negative feedback was positively associated with both accuracy and effectiveness (average r 's = $.31$ and $.49$, respectively), whereas the tendency to seek positive feedback was negatively associated with both outcome variables (average r 's = $-.14$ and $-.27$, for accuracy and effectiveness, respectively); (4) the three feedback-seeking strategy variables were positively correlated with each other (average $r = .29$); (5) the inquiry strategy was positively correlated with the overall effectiveness rating (average $r = .20$); (6) the tendency to seek negative feedback was positively associated with inquiry (average $r = .37$); and (7) the tendency to seek positive feedback was positively associated with indirect cue monitoring (average $r = .17$). Also, in general, the magnitude of the correlations among the independent variables did not indicate a multicollinearity problem.⁶ They ranged from $-.25$ to $.46$, with a median of $.12$.

Table 4 summarizes the results for Hypotheses 1 through 4. As hypothesized, the tendency to seek negative feedback was positively associated with the accuracy score for all three constituencies (β s = $.25$, $.25$, and $.34$, $p < .001$, for superiors, subordinates, and peers). The tendency to seek positive feedback was not related to the managers' accurate knowledge of

⁵ We followed several recommendations outlined in Podsakoff and Organ (1986) to avoid or estimate the potential common method variance problem. First, we placed the feedback-seeking items prior to the accuracy and effectiveness items in the survey to diminish the influence of implicit theories respondents might have had about the effectiveness determinants. Second, we examined the amount of variance the first factor accounted for and verified a six-factor structure among the five feedback-seeking variables and the overall effectiveness measure. The first factor accounted for only 26.9 percent of the total variance. The six-factor solution was confirmed. These checks suggest that common method variance was not a serious concern in this study.

⁶ We found no definitive statement on the level of correlation that would constitute a serious multicollinearity problem. Most researchers do not seem concerned until the correlation exceeds $.75$. Green (1978: 227) argued that no predictor should have a multiple correlation with the remaining predictors that exceeds that of the criterion variable with the full set of predictors. Our data passed this test.

TABLE 3
Intercorrelations Among Feedback-Seeking Behaviors, Accuracy in Knowledge of Constituency Evaluations, and Overall Effectiveness Ratings

Variables	Means	s.d.	Y_1	Y_2	X_1	X_2	X_3	X_4
Superiors								
Y_1 . Accuracy in knowledge	335.36	18.63						
Y_2 . Overall effectiveness rating	5.08	1.28	.39***					
X_1 . Negative feedback	2.98	0.82	.26***	.46***				
X_2 . Positive feedback	2.92	0.78	-.12*	-.25***	-.25***			
X_3 . Inquiry strategy	2.52	0.89	.08	.14**	.32***	.11*		
X_4 . Direct cue monitoring	3.40	0.69	.02	-.02	-.02	.05	.24***	
X_5 . Indirect cue monitoring	1.81	0.72	-.05	-.11*	-.08	.12*	.21***	.26***
Subordinates								
Y_1 . Accuracy in knowledge	331.38	24.78						
Y_2 . Overall effectiveness rating	5.13	1.45	.52***					
X_1 . Negative feedback	2.99	0.91	.32***	.50***				
X_2 . Positive feedback	2.82	0.84	-.19***	-.29***	-.25***			
X_3 . Inquiry strategy	1.85	0.87	.16***	.22***	.32***	.05		
X_4 . Direct cue monitoring	3.01	0.95	.18***	.25***	.32***	-.02	.41***	
X_5 . Indirect cue monitoring	2.28	1.01	.07	-.00	.04	.16***	.19***	.35***
Peers								
Y_1 . Accuracy in knowledge	332.28	22.92						
Y_2 . Overall effectiveness rating	4.63	1.37	.48***					
X_1 . Negative feedback	2.82	0.89	.36***	.51***				
X_2 . Positive feedback	3.00	0.76	-.11***	-.26***	-.25***			
X_3 . Inquiry strategy	2.05	0.90	.18***	.25***	.46***	.04		
X_4 . Direct cue monitoring	3.07	0.81	.11***	.21***	.20***	.08	.40***	
X_5 . Indirect cue monitoring	1.91	0.83	-.02	-.02	-.00	.23***	.26***	.30***

* $p < .05$ ** $p < .01$ *** $p < .001$

TABLE 4
Regression Analysis Results

Feedback-Seeking Variables	Feedback Sources ^a					
	Superiors		Subordinates		Peers	
	Accuracy	Effectiveness	Accuracy	Effectiveness	Accuracy	Effectiveness
Focal manager's tendency to						
Seek negative feedback	.25***	.33***	.25***	.30***	.34***	.34***
Seek positive feedback	-.06	-.13**	-.14***	-.14***	-.02	-.15***
Use the inquiry strategy	.00	.04	.06*	.05	.01	-.01
Monitor direct cues	.03	-.01	.05	.08**	.05	.13***
Monitor indirect cues	-.03	-.06	.05	-.06*	-.03	-.01
ΔR^2 ^b		(.16)***		(.15)***		(.17)***
Accuracy in knowledge						
of evaluation		.28***		.38***		.33***
Adjusted R^2	.06	.29	.13	.41	.13	.39
F	5.39***	24.54***	31.01***	122.89***	31.16***	114.50***
Standard error of estimate	18.06	1.14	23.17	1.11	21.43	1.07

^a For superiors, $N = 340$; for subordinates, $n = 1,041$; and for peers, $n = 1,052$.

^b The statistic in parentheses is the unique R^2 in the effectiveness rating accounted for by the feedback variables after the effects of accuracy are controlled.

* $p < .05$

** $p < .01$

*** $p < .001$

superiors' and peers' evaluations (β s = $-.06$ and $-.02$, n.s.) whereas it was negatively related to their accurate knowledge of subordinates' evaluation ($\beta = -.14$, $p < .001$). These results supported Hypothesis 1. Hypothesis 2 was also supported. Controlling for accuracy, we found that the tendency to seek negative feedback was positively associated with overall effectiveness ratings from all three constituencies (β s = $.33$, $.30$, and $.34$, $p < .001$, for superiors, subordinates, and peers). In contrast, the tendency to seek positive feedback was negatively associated with all three overall effectiveness ratings (β s = $-.13$, $p < .01$; and $-.14$ and $-.15$, $p < .001$).

Hypothesis 3, however, received only weak support. Only one of the feedback-seeking strategy variables was associated with the managers' accurate knowledge of constituency evaluations. The regression coefficient for inquiry was positive and significant ($\beta = .06$, $p < .05$) on the subordinates' accuracy score. This result is consistent with Hypothesis 3. However, monitoring was unrelated to any of the three accuracy scores.

Table 4 shows no support for Hypothesis 4, which proposed a negative effect of inquiry and a null effect of monitoring for overall effectiveness. Inquiry was not associated with any of the overall effectiveness measures. Monitoring of direct cues, however, was positively associated with the overall effectiveness ratings from subordinates ($\beta = .08$, $p < .01$) or from peers ($\beta = .13$, $p < .001$). Monitoring of indirect cues was negatively associated with the overall effectiveness ratings from subordinates ($\beta = -.06$, $p < .05$). Thus, findings did not support Hypothesis 4.

The amount of variance in the accuracy score the five feedback variables accounted for ranged from 6 percent in the superiors' model to 13 percent for both the subordinates' and peers' models. The amount of variance accounted for in the overall effectiveness ratings by the five feedback variables and accuracy was substantial. They accounted for 29 percent of the variance in the superiors' model, 41 percent in the subordinates' model, and 39 percent in the peers' model. With accuracy controlled, the feedback-seeking variables accounted for 16, 15 and 17 percent of the variance in the overall effectiveness ratings for the three feedback sources, respectively.

Table 5 summarizes results for Hypotheses 5 and 6. The one-way ANOVA results supported the general postulate that managers used different feedback-seeking strategies and sought different types of feedback from the three sources ($F = 12.96-74.81$, $p < .001$). A multiple range test using the Scheffé procedure indicated that the managers used inquiry and monitoring of direct cues more frequently with superiors than with either subordinates or peers. However, these managers also used indirect cue monitoring with peers as often as they used it with superiors. Hypothesis 5 was generally supported.

Hypothesis 6a received partial support. The managers had a stronger tendency to seek negative rather than positive feedback not only from superiors but also from subordinates. They were least likely to seek negative feedback from peers. Also as hypothesized, managers were most likely to seek positive feedback from superiors. However, they were equally likely to

TABLE 5
Results of Analysis of Variance

Feedback Variables	Superiors		Subordinates		Peers		F
	Means	s.d.	Means	s.d.	Means	s.d.	
Seeking strategy							
Inquiry	2.52	.89 ^{a,b}	1.85	.87 ^c	2.05	.90	74.81***
Direct cue monitoring	3.40	.69 ^{a,b}	3.01	.95	3.07	.81	27.56***
Indirect cue monitoring	1.81	.72 ^a	2.28	1.01 ^c	1.91	.83	58.88***
Feedback type							
Negative	2.98	.82 ^b	2.99	.91 ^c	2.81	.87	11.98***
Positive	2.92	.78	2.82	.84 ^c	3.00	.76	12.96***

* The difference in means between superiors and subordinates was significant at $p < .05$ or less.

^b The difference in means between superiors and peers was significant at $p < .05$ or less.

^c The difference in means between subordinates and peers was significant at $p < .05$ or less.

*** $p < .001$

seek it from peers. Managers were least likely to seek positive feedback from subordinates.

Results supported Hypotheses 6b and 6c. Managers were more likely to seek positive than negative feedback from peers ($t = 4.53$, $p < .001$) and more likely to seek negative feedback than positive feedback from subordinates ($t = 4.09$, $p < .001$).

According to our logic for Hypothesis 2, however, by seeking more positive than negative feedback from peers, managers should pay a social cost of lowering their effectiveness as perceived by this source. To assess this proposition, we compared the effectiveness ratings the three sources gave (see Table 3 for the mean values) using t -tests. The mean effectiveness rating peers gave was, in fact, significantly lower than that given by both the superiors ($t = -5.35$, $p < .001$) and the subordinates ($t = -8.10$, $p < .001$).

Finally, an additional analysis was performed on the accuracy scores to determine with which constituency the managers were most accurate. The results of a one-way ANOVA ($F = 4.27$, $p < .01$) suggested that the managers were most accurate in estimating their superiors' evaluations of their performance on the ten managerial roles. They were equally accurate in estimating the subordinates' and peers' evaluations.

DISCUSSION

The theoretical basis for this research is a self-regulation framework that depicts standard setting, discrepancy detecting, and discrepancy reducing as important processes in people's attempts to improve their effectiveness. This study specifically examined the role of active feedback seeking in the self-regulation efforts of managers. The specific issues examined in the current research were: Is active feedback seeking associated with accuracy in detecting performance discrepancies? Is feedback seeking associated with per-

ceived effectiveness by constituencies? Do individuals seek feedback differently with different sources? Within each of these questions, we analyzed the influence of the type of information sought (positive or negative) and the strategy of seeking used (inquiry or monitoring) to develop a fine-grained understanding of feedback-seeking dynamics in the self-regulation process. The results reveal that feedback-seeking behavior is associated both with how accurately managers know others' opinions of their work and with others' opinions of managers' overall effectiveness. Furthermore, the nature of feedback-seeking behavior was also shown to vary with different feedback sources.

Feedback Seeking and Accuracy

The findings suggest that although a tendency to seek positive feedback will not necessarily hurt managers, a willingness to seek negative feedback is associated with more accurate knowledge of how others evaluate their work. Thus, managers who are willing to seek negative feedback should be better able to keep their efforts on track with regard to their goals.

These findings are important in light of the previous controversial evidence on people's willingness to seek out negative information (cf. Swann & Read, 1981; Trope, 1975). As mentioned, previous evidence was collected in laboratories, where there were no particular costs to an individual's holding an inaccurate self-view. The self-regulation framework suggests that in organizations, inaccurate knowledge has some clear costs. Managers cannot meet or attempt to influence their constituents' demands if they cannot accurately assess how these constituents are responding to or evaluating their work. This failure can result in unrealistic goal setting, misguided efforts, or failure to undertake necessary remedial actions (Ashford, 1989). Given this reality, it is perhaps not surprising that in this field study the willingness to seek negative feedback paid off in terms of increased accuracy.

The strategies chosen to obtain feedback were also related to accuracy. In examining these effects, this study first revealed that monitoring is a more complex process than that described by Ashford and Cummings (1983). The types of cues individuals monitor could be critical. Monitoring of direct cues involved managers' attending to informal feedback or to casual remarks others made directly about them. Monitoring of indirect cues, on the other hand, seemed to focus on indirect data that were less informative or more susceptible to inference errors. For example, people may not return phone calls for many reasons. To infer a feedback evaluation from this cue could be highly misleading. Further study of the impact of feedback-seeking style at a more refined level is clearly needed.

We hypothesized that the feedback-seeking strategy a manager used would also be associated with accuracy because the feedback obtained with each strategy requires varying amounts of inference. This hypothesis was based on Ashford and Cummings's (1983) suggestion that monitoring requires a greater amount of inference than inquiry and, hence, knowledge

derived from monitoring should be less accurate than knowledge derived from inquiry. Results from this study provided only marginal support for this assertion. Inquiry was related positively to accuracy with one source, subordinates, whereas monitoring was not related to accuracy with any of the sources. These results suggest that monitoring may not require more inference than inquiry since it was not associated with inaccuracy. It may be that the different feedback-seeking strategies require different types of inference rather than differing amounts of inference. The inference required in inquiry may simply be more social in nature, for instance, a manager might wonder if a feedback source is inflating an appraisal to be nice or how much trust there is in a relationship. It is also possible that seekers may contribute to inaccuracy by inquiring in such a way that they elicit feedback that confirms their own self-views rather than unbiased appraisals.

Besides the inference each feedback-seeking strategy requires, additional variables may explain accuracy as well. Variables such as the types of environmental cues that individuals seek out, seekers' self-consciousness (Fenigstein, Carver, & Scheier, 1975) or self-monitoring ability (Snyder, 1979), how accurately they interpret the feedback they obtain, and the frequency of their interaction with feedback sources may provide additional explanatory power. Potentially, the frequency of ongoing interaction may be a very important moderating variable. Interaction presumes exchange of information. Frequency of interaction also presumes that both parties perceive some value in the exchange between them. Thus, frequent interactors should gain a more accurate sense of each others' opinions and feelings than infrequent interactors. The sheer number of participants in a manager's social network, however, may constrain interaction frequency. Future studies might include measures of feedback seekers' spans of control as well as of the sizes of their peer networks.

In summary, these results suggest that if the self-regulatory objective of managers is to gain accurate knowledge of how constituents view their work, the managers should focus on seeking negative, rather than positive, feedback. Further, they should not be too concerned with the type of strategy used in obtaining feedback. Neither inquiry nor monitoring appeared to offer an accuracy advantage.

Feedback Seeking and Effectiveness

The results provided reasonable support for the hypotheses that the type of feedback managers sought and the seeking strategy they employed would influence constituents' perceptions of the managers' effectiveness. Specifically, the findings on type of feedback are consistent with the impression management argument that observers (constituents) react unfavorably to managers' visible interest in positive feedback and respond favorably when they perceive that a manager is interested in obtaining negative feedback. These reactions may account for the positive association between the tendency to seek negative feedback and effectiveness ratings and the negative association between positive feedback and effectiveness.

Together with the accuracy findings reported above, these findings specifically confirm the importance that negative feedback plays in the self-regulation process and generally suggest, as did Herold and Parsons (1985), that those investigating how individuals respond to and use their feedback environment should pay attention to the type of feedback individuals seek and not just to the amount or direction of seeking. Our findings also reinforce the importance seeking negative feedback has in actual organizations as opposed to laboratory settings.

When we controlled for the type of feedback sought, we found that the strategy of seeking used also had both social benefits and social costs. Subordinates' and peers' opinions of the focal managers were positively associated with the managers' tendency to monitor direct cues. Further, subordinates' opinions were negatively related to the managers' tendency to monitor indirect cues. Perceived reliance on these indirect cues might have conveyed a sense of insecurity to subordinates.

One surprising finding was the lack of an association between inquiry and constituents' effectiveness opinions. This lack of association suggests, in contrast to the implications of previous research, that inquiry may carry no particular social cost and may be an acceptable behavior, especially when it is used to seek negative feedback. Would inquiry involve a social cost if it were used to seek positive feedback? We performed some additional analyses to investigate this question and found only a few significant interactions between type and strategy. For example, the perceived effectiveness ratings the subordinates gave were the highest for managers who tended to seek negative feedback using an inquiry strategy and lowest when they were low on both seeking negative feedback and using the inquiry strategy. Additionally, our results show both that managers sought more positive than negative feedback from peers and that their effectiveness rating with peers was lower than their rating with superiors and subordinates. Although these additional results are both interesting and consistent with the findings for the main hypotheses analyzed in this study, they should be treated as exploratory and tentative at this point. The amounts of variance these interaction effects accounted for were very small (less than 1 percent in most cases), and we do not know for sure whether these managers actually used inquiry to obtain negative feedback. The correlational results (Table 3), however, suggest that the seeking strategies were differentially associated with the two types of feedback. Future research should be designed for a direct investigation of the potential interaction effects of feedback types and seeking strategies on outcomes.

In total, these results supported our arguments regarding the impression management concerns associated with active feedback seeking. Seeking negative feedback and monitoring direct (or relevant) cues appeared to be a social benefit; both were positively related to perceived overall effectiveness. Seeking positive feedback and monitoring indirect (or less relevant) cues appeared to carry some social costs. These were negatively related to the sources' opinions of the overall effectiveness of the seeker managers.

Feedback-Seeking Sources

The third issue addressed in this research was whether seeking was conducted differently with different feedback sources. We found that managers sought different types of feedback from and used different seeking strategies with each source. This behavior varied according to the managers' power relationships with the sources. As expected, managers were more active in seeking feedback from their superiors than from the other two sources. This active feedback seeking seemed to have instrumental value: the managers' knowledge of their superiors' evaluations of their work was more accurate than their knowledge of the other sources' evaluations. This finding is consistent with the argument that superiors' feedback is perceived to be highly valuable information for managers. Future research should determine what might induce managers to seek more feedback from peers and subordinates and could also analyze the consequences of such increased feedback-seeking activity for the seekers' perceived effectiveness.

The differences in the types of feedback sought from peers and from subordinates were consistent with an impression management logic: managers want to make salient their positive performance among peers and to convey an image of responsiveness as bosses among subordinates.

Limitations of the Study

Some cautions are in order about the interpretation of the present results. Because this study was cross-sectional, we could not assess causality between the independent and dependent variables. It may be that effective managers are more confident and thus more willing to seek negative feedback. They might also have strong egos and thus be willing to use direct inquiry in seeking feedback. In addition, this study focused on the relationships of feedback seeking and managerial effectiveness. Clearly, there are many additional possible predictors of managerial effectiveness. Future research should include other important predictors of effectiveness in assessing the unique contribution by active feedback seeking. Because there is implied causality between feedback seeking and managerial effectiveness, more controlled and preferably longitudinal studies are needed to test causality and to rule out alternative causes.

The results also may be susceptible to attributional biases associated with respondents' implicit theories of the relationship between feedback seeking and effectiveness. Individuals might attribute different feedback-seeking behavior to effective and ineffective managers. Even though we placed the feedback-seeking items in the survey before the effectiveness items to reduce this "consistency motif" (Podsakoff & Organ, 1986: 534), we cannot completely rule out attributional bias in these results.

Further, because this study used constituents' reports of managers' feedback-seeking behavior as data, we cannot draw conclusions regarding managers' intentions. We don't know whether managers consciously seek feedback or whether they see a connection between feedback seeking and effec-

tiveness. Given our arguments regarding impression management, however, how managers are perceived—whatever their intentions may be—is probably the most important variable. Nonetheless, how intentions might affect feedback seeking is an important topic for future research.

There may be some limitations to the generalizability of these findings owing to the nature of the people and organization studied. Some might argue that performance pressure is lower in public agencies than in the private sector. However, if this argument were true, the managers studied here might have been less inclined to engage in self-regulation than employees of private firms. Thus, these respondents actually provided a more conservative test of the hypotheses than private employees would have. It should be noted that the accuracy score was quite large for these managers. This result might be due to the organization's use of an explicit formal performance measurement system and the high frequency of interaction among unit directors. Such a managerial context could be unique to this organization. It is unknown, without further research, whether the findings from this study are generalizable to organizations that have more ambiguous performance measurement systems and in which, therefore, information exchange and interaction might be more important than in the organization we studied.

The experience level of the focal managers may further limit the generalizability of the results. These managers had an average company tenure of 21 years and an average effectiveness rating of 4.95 out of a possible 7 points. The large accuracy scores also suggest they had a good knowledge of others' opinions about themselves. These characteristics suggest that the results may not be generalizable to individuals who are newer on the job than the people studied here or to those with performance problems. Indeed, such individuals may be overwhelmed by the information obtained via frequent feedback seeking. It is possible that feedback seekers' career stage, company tenure, and performance level moderate the relationships of feedback types, seeking strategies, and feedback sources to accuracy and effectiveness.

Finally, using one organization we could not test the importance of feedback-seeking norms. Assuming that organizations vary in the degree to which it is acceptable for their members to solicit feedback from others and in the meaning ascribed to such behavior, such norms should affect both the amount and the type of feedback sought. Future research using multiple organizations might address this issue.

CONCLUSIONS AND DIRECTIONS FOR FUTURE RESEARCH

The results of our study supported the importance of active feedback seeking in the self-regulation process for managers, with active seeking defined as including the explicit seeking of feedback and a focus on negative rather than positive information. Such active feedback seeking is associated with accuracy in detecting performance discrepancies and gaining favorable effectiveness ratings from multiple constituencies. Although Ashford and

Cummings (1983) argued that feedback is an important individual resource, this study is the first to show that active feedback seeking has a payoff in terms of important outcomes. Prior research has focused more on the antecedents of feedback than on its effects. If the logic underlying these results is correct, the payoff of active feedback seeking ought to increase as managers move up in a hierarchy to levels at which feedback on performance is scarce and infrequent (Jaques, 1961). In such cases, active feedback seeking could become an important effectiveness tool. Active feedback seeking by senior-level managers has another advantage: their actions may sanction such behavior and create a norm of active feedback seeking in an organization. This norm-setting role of senior managers could be an interesting subject for future research.

Future studies should also consider other influences on the impression management dynamics that are inherent in the feedback-seeking process. Even though this study examined the type of feedback sought and the seeking strategy used, future studies could examine the style of seeking. For example, managers might be able to seek positive feedback in such a way that it seems they are asking for negative feedback. Factors such as the performance history of a seeker could also influence the impression management dynamics. For high performers, feedback seeking may convey a different message than it does for low performers.

Researchers should also consider contextual influences on the impressions that feedback seeking conveys. Contextual factors such as an organization's culture and feedback-seeking norms may influence whether feedback seeking is thought of as a sign of weakness, interest in other people's welfare, self-preoccupation, and so forth. Such social constructions may be an important influence on the willingness to seek feedback in different firms.

Future research might also expand the set of constituencies. Whereas the current research focused exclusively on internal constituencies, external constituencies, such as clients and customers, may be equally important in some managerial positions. In fact, one additional predictor of effectiveness might be how managers construe their constituency set, that is, whom they include and whom they ignore.

Finally, this research focused on only one, albeit an important, subprocess of the self-regulation framework. However, although active feedback seeking may produce accurate knowledge, knowledge itself is useless unless it is used to achieve a purpose. Managers must act on the knowledge attained. Indeed, it is likely that constituents' ratings of a manager's effectiveness will depend on what the manager does following the seeking of feedback. If a manager typically seeks negative feedback but does not alter his or her behavior as a result of that feedback, constituents may begin to believe that the manager is ineffective. Essentially, research is needed on the discrepancy reduction subprocess that follows feedback seeking. Such research could contribute to the self-regulation literature and also to the role conflict literature. Research on role conflict has been focused mainly on antecedent

and outcome variables (Jackson & Schuler, 1985) rather than on strategies for coping with conflict. The self-regulation process presented here suggests that dealing with role conflict (i.e., incompatible expectations) and coping with performance discrepancies (i.e., deviations between standards and enacted behaviors) are critical for managerial success. Research is needed on questions such as: What alternative strategies do managers or individuals employ to reduce detected discrepancies between actual behavior and performance goals? What individual and contextual factors influence the use and effectiveness of different discrepancy reduction methods? Investigation on the discrepancy reduction subprocess of self-regulation offers a fruitful and important line of inquiry for researchers who are interested in self-regulation specifically and in managerial effectiveness in general.

This study's results also suggest some new theoretical directions for work on self-regulation and control theory. First, they substantiate Klein's (1989) argument that control theory needs to move beyond its implicit assumption of a single goal (or goal hierarchy) and a single feedback message to consider situations in which individuals have multiple goals and competing goal hierarchies and receive feedback, often conflicting feedback, from multiple sources. Our arguments and data suggest that in organizations, managers clearly live in the complex world Klein (1989) described and that their failure to self-regulate actively drawing on all sources leads to effectiveness decrements. Future controlled laboratory studies could profit from assessing self-regulatory reactions under these more complex—but more realistic—conditions. Researchers need to learn, for example, the process by which multiple conflicting feedback messages, each obtained from an important constituency, are converted to a single "error message."

Our study also highlights the interpersonal factors that may render a control system that can be described in fairly mechanistic terms (Locke & Latham, 1990) inoperable in organizations. That is, control theory presumes that an "organism" will receive feedback or spontaneously and frequently seek it in order to detect discrepancies; the example of a control system most frequently cited in such work is a thermostat that senses the air around it to determine if it is maintaining the correct room temperature. Although control theory provides a framework for describing managerial behavior, managers clearly are not thermostats. They do not mechanistically seek feedback. Rather, there seem to be a variety of interpersonal dynamics, such as impression management, and intrapersonal dynamics, such as ego defense (cf. Northcraft & Ashford, 1990), that govern their seeking behavior. These factors often discourage managers from seeking the very information on which their control systems rely. Control theory research might benefit by taking these factors into account.

REFERENCES

- Ammons, R. B. 1956. Effects of knowledge of performance: A survey and tentative theoretical formulation. *Journal of General Psychology*, 54: 279–299.
-

- Argyris, C., & Schon, F. S. 1974. *Theory in practice: Increasing professional effectiveness*. San Francisco: Jossey-Bass.
- Ashford, S. J. 1986. The role of feedback seeking in individual adaptation: A resource perspective. *Academy of Management Journal*, 29: 465-487.
- Ashford, S. J. 1989. Self-assessments in organizations: A literature review and integrative model. In L. L. Cummings & B. M. Staw (Eds.), *Research in organizational behavior*, vol. 11: 133-174. Greenwich, CT: JAI Press.
- Ashford, S. J., & Cummings, L. L. 1983. Feedback as an individual resource: Personal strategies of creating information. *Organizational Behavior and Human Performance*, 32: 370-398.
- Cardy, R. L. 1982. *The effect of affect in performance appraisal*. Unpublished doctoral dissertation, Virginia Polytechnic Institute and State University, Blacksburg.
- Cardy, R. L., & Dobbins, G. H. 1986. Affect and appraisal accuracy: Liking as an integral dimension in evaluating performance. *Journal of Applied Psychology*, 71: 672-678.
- Carver, C. S., & Scheier, M. F. 1981. *Attention and self-regulation: A control-theory approach to human behavior*. New York: Springer-Verlag.
- Cronbach, L. J., & Gleser, G. L. 1953. Assessing similarity between profiles. *Psychological Bulletin*, 50: 456-473.
- Eder, R. W., & Fedor, D. B. 1989. Impression management: Its interpretative role in the supervisor-employee feedback process. In R. A. Giacalone & P. Rosenfeld (Eds.), *Impression management in the organization*: 327-342. Hillsdale, NJ: Lawrence Erlbaum Associates.
- Felson, R. B. 1980. Communications barriers and the reflected appraisal process. *Social Psychology Quarterly*, 43: 223-233.
- Fenigstein, A., Carver, C. S., & Scheier, M. F. 1975. Public and private self-consciousness assessment and theory. *Journal of Consulting and Clinical Psychology*, 45: 522-527.
- Fisher, C. D. 1979. Transmission of positive and negative feedback to subordinates: A laboratory investigation. *Journal of Applied Psychology*, 64: 533-540.
- Green, D. E., 1978. *Analyzing multivariate data*. Hinsdale, IL: Dryden Press.
- Greene, C. N. 1972. Relationships among role accuracy, compliance, performance evaluation, and satisfaction within managerial dyads. *Academy of Management Journal*, 15: 205-215.
- Greene, C. N., & Organ, D. W. 1973. An evaluation of causal models linking received role with job satisfaction. *Administrative Science Quarterly*, 18: 95-103.
- Greene, W. H. 1990. *Econometric analysis*. New York: Macmillan.
- Greller, M. M., & Herold, D. M. 1975. Sources of feedback: A preliminary investigation. *Organizational Behavior and Human Performance*, 13: 244-256.
- Hanser, L. M., & Muchinsky, P. M. 1978. Work as an information environment. *Organizational Behavior and Human Performance*, 21: 47-60.
- Herold, D. M., & Parsons, C. K. 1985. Assessing the feedback environment in work organizations: Development of the job feedback survey. *Journal of Applied Psychology*, 70: 290-309.
- Ilgen, D. R., Fisher, C. D., & Taylor, S. M. 1979. Consequences of individual feedback on behavior in organizations. *Journal of Applied Psychology*, 64: 359-371.
- Ilgen, D. R., & Knowlton, W. A. 1980. Performance attributional effects on feedback from subordinates. *Organizational Behavior and Human Performance*, 25: 441-456.
- Jackson, S., & Schuler, R. 1985. A meta-analysis and conceptual critique of research on role ambiguity and role conflict in work settings. *Organizational Behavior and Human Decision Processes*, 36: 16-78.
-

- Janis, I., & Mann, L. 1977. *Decision making*. New York: Free Press.
- Jaques, E. 1961. *Equitable payment*. New York: Wiley.
- Johns, G. 1981. Difference measures of organizational behavior variables: A critique. *Organizational Behavior and Human Performance*, 27: 443-463.
- Kale, S. H. 1989. Dealer dependence and influence strategies in a manufacturing-dealer dyad. *Journal of Applied Psychology*, 74: 379-384.
- Katz, D., & Kahn, R. L. 1978. *The social psychology of organizations* (2d ed.). New York: Wiley.
- Kenny, D. A., & Zaccaro, S. J. 1983. An estimate of variance due to traits in leadership. *Journal of Applied Psychology*, 68: 678-685.
- Kipnis, D., & Schmidt, S. M. 1988. Upward influence style: Relationships with performance evaluations, salary, and stress. *Administrative Science Quarterly*, 33: 528-542.
- Kipnis, D., Schmidt, S. M., & Wilkinson, I. 1980. Intraorganizational influence tactics: Explorations in getting one's way. *Journal of Applied Psychology*, 65: 440-452.
- Klein, H. J. 1989. An integrated control theory model of work motivation. *Academy of Management Review*, 14: 150-172.
- Larson, J. R. 1986. *Supervisors' performance feedback to subordinates: The impact of subordinate performance valence and outcome dependency*. Working paper, University of Illinois, Chicago.
- Locke, E. A., & Latham, G. P. 1990. *A theory of goal setting and task performance*. Englewood Cliffs, NJ: Prentice-Hall.
- Lombardo, M. M., & McCall, M. W., Jr. 1982. Leader on line: Observations from a simulation of managerial work. In J. G. Hunt, U. Sekaran, & C. A. Schriesheim (Eds.), *Leadership: Beyond establishment views*: 50-67. Carbondale: Southern Illinois University Press.
- Lord, R. G., & Hanges, P. J. 1987. A control system model of organizational motivation: Theoretical development and applied implications. *Behavioral Science*, 32: 161-179.
- Luthans, F., & Davis, T. 1979. Behavioral self-management (BSM): The missing link in managerial effectiveness. *Organizational Dynamics*, 8: 42-60.
- Mabe, P. A., & West, S. G. 1982. Validity of self-evaluation of ability: A review of meter analysis. *Journal of Applied Psychology*, 67: 280-296.
- Manz, C. C., & Sims, H. P., Jr. 1980. Self-management as a substitute for leadership: A social learning theory perspective. *Academy of Management Review*, 5: 361-367.
- Miller, D. T. 1976. Ego involvement and attributions for success and failure. *Journal of Personality and Social Psychology*, 34: 901-906.
- Mills, P. K. 1983. Self-management: Its control and relationship to other organizational properties. *Academy of Management Review*, 8: 445-453.
- Mintzberg, H. 1973. *The nature of managerial work*. Englewood Cliffs, NJ: Prentice-Hall.
- Morse, J., & Wagner, F. 1978. Measuring the process of managerial effectiveness. *Academy of Management Journal*, 21: 23-35.
- Nisbett, R. E., & Wilson, T. D. 1977. Telling more than we can know: Verbal reports on mental processes. *Psychological Review*, 84: 231-259.
- Northcraft, G., & Ashford, S. J. 1990. The preservation of self in everyday life: The effects of performance expectations and feedback context on feedback inquiry. *Organizational Behavior and Human Decision Processes*, 47: 42-64.
- O'Reilly, C. A., III. 1977. Superiors and peers as information sources, workgroup supportiveness, and individual decision-making performance. *Journal of Applied Psychology*, 62: 632-635.
- O'Reilly, C. A., III. 1983. The use of information in organizational decision-making: A model
-

- and some propositions. In L. L. Cummings & B. M. Staw (Eds.), *Research in organizational behavior*, vol. 5: 109–139. Greenwich, CT: JAI Press.
- Podsakoff, P. M., & Organ, D. W. 1986. Self-reports in organizational research: Problems and prospects. *Journal of Management*, 12: 531–544.
- Salancik, R. G., Calder, B. J., Rowland, K. M., Leblebici, H., & Conway, M. 1975. Leadership as an outcome of social structure and process: A multidimensional analysis. In J. G. Hunt & E. E. Larson (Eds.), *Leadership frontiers*: 81–101. Columbus, OH: Kent University Press.
- Snyder, M. 1979. Self-monitoring processes. In L. Berkowitz (Ed.), *Advances in experimental social psychology*, vol. 12: 86–124. New York: Academic Press.
- Swann, W. B., Jr., & Ely, R. J. 1984. A battle of wills: Self-verification vs. behavioral confirmation. *Journal of Personality and Social Psychology*, 46: 1287–1302.
- Swann, W. B., & Read, S. I. 1981. Acquiring self-knowledge: The search for feedback that fits. *Journal of Personality and Social Psychology*, 41: 1119–1128.
- Tesser, A., & Rosen, S. 1975. The reluctance to transmit bad news. In L. Berkowitz (Ed.), *Advances in experimental social psychology*, vol. 8: 194–232. New York: Academic Press.
- Trope, Y. 1975. Seeking information about one's own ability as a determinant of choice among tasks. *Journal of Personality and Social Psychology*, 32: 1004–1013.
- Trope, Y. 1982. Self-assessment and task performance. *Journal of Experimental Social Psychology*, 18: 201–215.
- Trope, Y., & Bassock, M. 1982. Confirmatory and diagnosing strategies in social information gathering. *Journal of Personality and Social Psychology*, 43: 22–34.
- Trope, Y., & Ben-Yair, E. 1982. Task construction and persistence as means for self-assessment of abilities. *Journal of Personality and Social Psychology*, 42: 637–645.
- Tsui, A. S. 1984a. A multiple-constituency framework of managerial reputational effectiveness. In J. G. Hunt, C. A. Hosking, C. A. Schriesheim, & M. Stewart (Eds.), *Leaders and managers: International perspectives on managerial behavior and leadership*: 28–44. New York: Pergamon Press.
- Tsui, A. S. 1984b. A role set analysis of managerial reputation. *Organizational Behavior and Human Performance*, 34: 64–96.
- Vroom, V. H. 1964. *Work and motivation*. New York: Wiley.

Susan Ashford is an associate professor of organizational behavior at the Amos Tuck School of Business Administration, Dartmouth College. She received her Ph.D. degree from Northwestern University in 1983. Her research interests include how individuals seek and use feedback to regulate their behavior, managerial effectiveness, organizational change, and self-regulation.

Anne S. Tsui, an associate professor of organizational behavior in the Graduate School of Management University of California, Irvine, received her Ph.D. degree from the University of California, Los Angeles. Her current research interests include the study of managerial reputational effectiveness, effectiveness of the human resource management function in complex organizations, and analysis of demographic effects on work outcomes. One of her current projects, funded by the National Science Foundation, is focused on analyzing the nature of employer-organization relationships in firms facing competitive pressure for flexibility in managing the employee resource.

VICTIMS AND SHAREHOLDERS: THE DILEMMAS OF PRESENTING CORPORATE POLICY DURING A CRISIS

ALFRED A. MARCUS
University of Minnesota
ROBERT S. GOODMAN
York University

Corporate crises—such as accidents, scandals, and product safety incidents—exacerbate stakeholder demands in such a way that conflict can arise between the interests of shareholders and crisis victims. We show that such conflict arises in the case of accidents, in which (1) the needs of victims are immediate and concrete and the potential corporate liability is great and (2) management can plausibly claim there are mitigating circumstances and factors beyond its control. In the case of accidents, if managers are accommodating to victims, shareholders are likely to suffer. The conflict does not arise in the case of scandals, for neither of those conditions holds. Shareholders benefit when managers are accommodating. This article discusses the theoretical and managerial implications of these findings.

In this research, we empirically analyzed the impact on the stock market of the announcements that corporate managements make during three types of crisis: accidents, scandals, and product safety incidents. Such crises affect all a corporation's stakeholders (Freeman, 1984), including shareholders, customers, employees, and suppliers. They also create a new category of stakeholders—the victims. As Shrivastava wrote, in a crisis “the most profoundly affected stakeholders, and ironically sometimes the most easily forgotten because of their powerlessness, are the victims” (1987: 23). Although the announcements managers make during a crisis can have profound impacts on both shareholders and victims, researchers have not carefully studied this phenomenon or constructed a theory of how such announcements

Many people helped bring this project to fruition. We would like to acknowledge the assistance of Patrick Hess, Gordon Alexander, and George Benson, who helped with the financial models; Grant Yonehiro, who provided technical assistance; Hyoung Koo Moon and Mark Weber, who helped analyze the data; and Ray Willis and Cheenu Balakrishnan, who helped us solve some statistical and methodological problems. Larry Cummings, Norman Bowie, Peter Ring, and Elizabeth Maines read and commented on early drafts and Judith Thompson made very useful suggestions when we presented this research at an annual Academy of Management meeting. This project was supported in part by a University of Minnesota Graduate School Grant-In-Aid Award and Syracuse University Faculty Senate Grant Number 104.

may affect the interests of victims and shareholders. Many corporate managements have appeared to be accommodating to the victims of crises. Lee Iacocca, for example, apologized for the Chrysler executives who were indicted for rigging cars with disengaged odometers, and Frank Lorenzo took out advertisements saying he was sorry for the misplaced baggage, delays, and reservation errors that plagued Continental Airlines (Ansberry, 1987). In contrast, in other situations corporate leaders have consistently denied wrongdoing, even in the face of overwhelming evidence to the contrary, perhaps because their lawyers have warned that admissions could be used against them in court. Thus, after a gas leak from a Union Carbide plant killed thousands of people in Bhopal, India, and Warren Anderson, the corporation's chief executive, flew to the scene, apparently to show sympathy for the victims, the company offered a theory of sabotage as a defense and denied that it had any responsibility for the tragedy.

Confronted with a crisis, some corporations appear accommodating and others appear defensive. What impact do these diverse presentations of corporate policy have on shareholder interests? In this research, we tried to explain how investors will respond to the presentations of corporate policy made during a crisis, basing predictions on distinctions between the three types of crisis studied. We then examined 112 presentations of corporate policy during crises to determine how investors actually were affected.

AGENCY THEORY AND SIGNALING THEORY

Agency theory and signaling theory are both relevant for understanding the dilemmas of presenting corporate policy during a crisis. The economic approach to agency theory (Fama, 1980; Jensen & Meckling, 1976) emphasizes the stock market valuation of a company. It is an investor's model (cf. Hirsch, Friedman, & Koza, 1990) that fits the classic view of firms in which serving shareholder interests is the primary goal of managers (Friedman, 1962; MacAvoy, 1981; Rappaport, 1981, 1983).¹ According to this view, corporations should subordinate the interests of crisis victims to the interests of shareholders.

Theorists have, however, often qualified the classic theory, stating that the claims of laws and ethics bound the obligation to earn profits (e.g., Friedman, 1962, 1970). In this qualified view, serving shareholder interests can include such activities as making charitable contributions, treating employees well, building community infrastructures, and attending to the needs of crisis victims. Nonetheless, the classic theory provides no guidance to managers about how to reconcile potentially conflicting interests. A different ethical standard, derived from religious sources such as the Sermon on the Mount or philosophical ones such as Kant's formulation of the categorical imperative (Johnson, 1974), requires an unconditional devotion to what is "right" regardless of whether being right is simply prudential. Under

¹ Preston and Post (1975) offer a critique of this model.

that standard, if shareholder interests conflict with the legitimate needs of crisis victims, corporations should sacrifice the needs of shareholders for those of victims.

The market price of a good or service is influenced by the signals the sellers send. Signaling theory is the study of those signals. It has been applied to many areas, including financial markets (Bhattacharya, 1979, 1980; Leland & Pyle, 1979; Ross, 1977) and advertising and public relations (Nelson, 1974). Porter (1980: 76) applied it to business strategy. The origins of signaling theory are in the strategic thinking of Schelling (1963), the sociology of Goffman (1961, 1969, 1974, 1981), and communications theory (Schramm, 1948; Westley & MacLean, 1970). Goffman has provided many insights about the use of signals for impression management, describing how people "engage in self-presentation in order to manage the identities that others assign to them" (cf. Tedeschi & Melburg, 1984: 31). When someone attributes negative or undesirable qualities to an actor, the actor must offer an explanation. The actor may attempt to excuse or justify its behavior, apologize and express remorse, guilt, or shame, or make attempts at restitution (Bies, 1987, 1988; Bies, Shapiro, & Cummings, 1988; Browning, 1988a, 1988b, 1989; Cummings & Anton, 1989; Sitkin & Bies, 1988). If others accept these explanations and actions, the actor's responsibility can be diminished, its positive identity restored, and its reputation reestablished.

Among economists, Spence (1973, 1974) formalized signaling theory and applied it to labor markets, but the theory may be applied to markets in general, including the stock market, where investors buy and sell stocks with incomplete information and can be influenced by presentations of corporate policy. In any market, (1) there is an information gap between buyers and sellers, with buyers knowing less about the commodity sold than sellers, and (2) sellers emit a signal at some time during a transaction, a signal to which buyers respond (Barzel, 1976; Mirrlees, 1971; Riley, 1975).

Though researchers have examined the effects of various types of corporate behavior on the stock market (Alexander, Benson, & Kampmeyer, 1984; Beatty & Zajac, 1987; Montgomery, Thomas, & Kamath, 1984), no one has studied the signals corporate managements send during crises. Studies have focused on crises themselves (cf. Sprecher & Pertl, 1983), examining specific incidents or types of incidents. Such studies include those focusing on product safety recalls (Bromiley & Marcus, 1989; Hofer, Pruitt, & Reilly, 1988; Jarrel & Peltzman, 1985), alleged corporate crimes and scandals (Davidson & Worrell, 1988; Strachan, Smith, & Beedles, 1983), airline crashes (Davidson, Chandy, & Cross, 1987), the Three Mile Island nuclear power plant accident (Spudeck & Moyer, 1989), the Chernobyl nuclear power plant accident (Fields & Janjigian, 1989), and the aforementioned Bhopal tragedy (Marcus & Goodman, 1989). With the exception of Marcus and Goodman (1989), none of these studies has examined corporate policy announcements following a crisis. None has looked at the changes in investors' expectations in response to the signals sent by management (cf. Alexander, Benson, & Gunderson, 1986; Bettis & Weeks, 1985; Schipper, Thompson, & Weil, 1987).

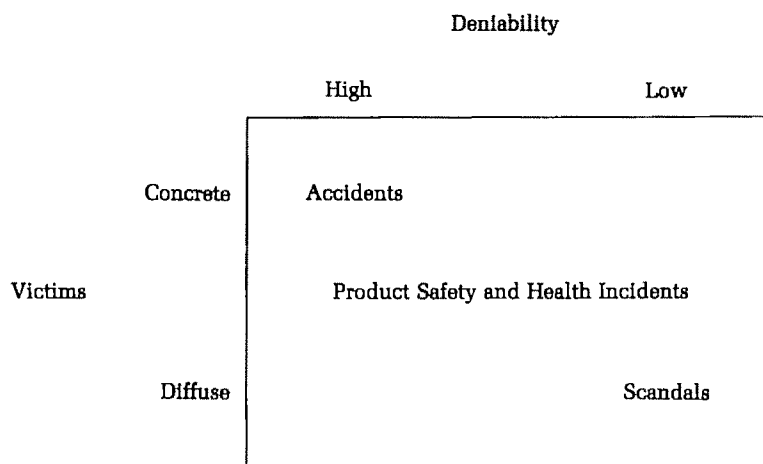
Crisis Types

A crisis is an emotionally charged event that can be a "turning point for better or worse" (Carroll, 1989: 492). In a crisis, a company's management can project an image at variance with undesirable interpretations of the crisis by issuing statements to clarify its policies or explain its behavior and announcing its intention to evaluate the situation and rectify matters so it does not recur (Meyers, 1986). Fink (1986) distinguished between crisis events themselves, over which management has no control, and management's presentation of a crisis, over which it has control. Crisis events themselves can result in losses in sales, production, investment opportunities, and prestige; delays; deterioration in relations with key constituencies; and the distraction of top management. A company's management can respond to a crisis with apologies and denials. It can announce reforms, introduce changes in procedures, open or close channels of communication, and indicate that it is making efforts to tighten or loosen corporate discipline (Fisse & Braithwaite, 1983). In some cultures—the Japanese, for example—a company's chief executive is expected to resign after a major crisis. The signals management sends can protect a company by opening avenues of retreat or by providing explanations for negatively perceived actions.

In research on international relations and economics, proponents of signaling theory have proposed that under some conditions it is in an actor's best interests to use signals for deception (Akerloff, 1970; Jervis, 1970; Joivanovic, 1981). However, Bettis (1983) and Peavey (1984) suggested that although investors may not accept company signals at face value, it is unlikely that they will completely disregard them. Since investors find it difficult to determine what best explains a crisis, and each of the explanations the various parties offer may have some plausibility, they are likely to place at least some credence in the explanations management offers (cf. Fombrun & Shanley, 1990).

But not all crises are alike, and the differences among them may be important. Crises differ in at least two important respects: first, in their effects on any victims they might have; and second, in what can be plausibly said about their causes (see Figure 1). On the basis of these factors, different types of crisis can be distinguished and predictions made about how corporate policy presentations during a crisis will affect investors. We distinguished three types of crisis. Accidents have identifiable victims. They are undesirable or unfortunate happenings that occur unexpectedly and without design. A company can plausibly deny responsibility for an accident because it can claim that the events occurred almost entirely by chance. The victims of a *scandal* are less identifiable than the victims of an accident. Scandals are disgraceful or discreditable occurrences that compromise the perpetrators' reputations. Responsibility for a scandal is hard to deny because the events usually are the result of faults and misdeeds. In terms of effects on victims and deniability, *product safety and health incidents* lie somewhere between accidents and scandals.

FIGURE 1
Classification of Crises



Accidents. Analyses of corporate accidents appear in the following sources: Buchholz, Evans, and Wagley (1985), Godson (1975), Keir, Mann, and Olsen (1972), Kemeny (1979), Perrow (1984), Sethi (1977), Sharp-lin (1985), Shrivastava (1987), Starling and Baskin (1985), and Sturdivant (1985). Accidents are discrete one-time events. They create a concrete class of victims: the people who are killed, injured, or otherwise suffer loss or misfortune. Victims usually engage legal counsel immediately after an accident (Lieberman, 1981), and these attorneys forcefully press the victims' claims against the offending company and threaten to go to court if an appropriate settlement is not reached. The attorneys generally are experienced, formidable foes who have proved themselves capable of winning multimillion dollar awards in the past (cf. Landes & Posner, 1987; Litan & Winston, 1988). For instance, in the prototypical Bhopal accident, Marvin Belli and a host of other famous litigators rushed to the scene (Shrivastava, 1987). The unpredictability of the U.S. court system, which makes it difficult to insure away the risks of accidents to a company, increases corporate anxiety about post-accident litigation.

Some qualifications in this description of accidents are in order. First, the property damage may be far greater than the human damage, as it is, for example, in an oil spill (Sethi, 1977). Nevertheless, an identifiable and well-organized group—to continue the oil spill example, environmentalists and their attorneys taking up the cause of violated nature—may fight vigorously against the company or companies that have perpetrated the damage. A second qualification is that all the human damage is not immediate. Some of it may not be precisely connected to the events surrounding an accident and easily proven in court to be their consequence; for example, when radiation is released after a nuclear accident, damaging effects may be latent for a long

time and the web of causation may be hard to unravel (Marcus, 1986). These qualifications do not negate our main point: accidents generally occur at a single point in time and create an identifiable group of victims who are well-represented by legal counsel. Generally motivated by threatened lawsuits, managers will tend to deny responsibility for accidents and to suppress their own human feelings of sympathy for the victims.

The question of interest to us was not simply what motivates management statements but rather why those statements have credibility with investors. To answer that question, it was necessary to probe more deeply into the causes of accidents (Perrow, 1984). Catastrophic accidents in complex, tightly coupled systems like nuclear power plants, airlines, marine transportation systems, and petrochemical complexes typically begin with unexpected interactions. The many components, parts, and operators in the system fail in some unanticipated way. The failure is incomprehensible for a time because of the complexity and tight coupling of the system. While no one knows what the problem really is, the accident spreads. According to Perrow (1984), such accidents in large-scale technological systems are uncommon, even rare, yet they are normal, indeed inevitable, and companies can do little to prevent them. It is unlikely that all the causes of an accident will come together at the same time; yet when an accident does occur, it is plausible for company spokespersons to declare that what has occurred is an "act of God" and for investors to believe that the company could not have foreseen or prevented what has taken place and that the accident does not reflect underlying inadequacies in either the company, its management, or its way of doing business.²

Since after an accident the motivation for a corporation to deny responsibility is great and such denial has some inherent plausibility, we predict that investors will react negatively to accommodative signals and positively to defensive ones. By an accommodative signal, we mean a statement in which management accepts responsibility, admits to the existence of problems, and takes actions to remedy a situation. A defensive signal is a statement in which management insists that the problems do not exist, tries to alleviate doubts about the firm's ability to generate future revenue, and takes action to resume normal operations rapidly.

Hypothesis 1: When a company is involved in an accident, its investors will react more positively to defensive signals than to accommodative signals.

Scandals. Analysis of corporate scandals appear in Boulton (1978), Fisse and Braithwaite (1983), Franklin (1986), Post (1978), Sampson (1973),

² Gaskins (1989: 17), however, noted that even though accidents are often perceived as unexpected or unforeseen occurrences, "as they surely are to some persons involved in them (usually the victims) . . . most injuries can also be anticipated by at least someone involved in the event." When an accident is litigated it is likely that the attorneys for the plaintiffs will try to implicate the organization involved, showing that some employees had foreknowledge of the event and did not take action.

Sethi (1977), and Litschert and Nicholson (1977). A scandal is not a discrete event. Usually it has obscure origins and no immediate victims. There is not likely to be a group of well-represented victims pressing its claims against an offending company. A scandal may harm a firm's competitors, but they are not likely to sue or to win large awards. Courts have frequently dismissed shareholder suits claiming misappropriation of funds, and when findings have favored the plaintiffs, the awards have been small. The political and economic system in which a scandal occurs in a sense is the victim, and the integrity of that system is what is compromised and has to be defended during the long, disturbing, and often titillating (to observers) process of revelation that accompanies a scandal. People's sense of fair play has been violated by someone's achieving power or accumulating riches in way the generally accepted, if not commonly followed, rules of the game prohibit.

The diffuse victims of a scandal pose less of a threat to the company involved than the concrete victims of an accident. Perhaps all the corporation will suffer from a scandal is public shame and a nominal fine from the government, the actual result of the 1975–76 Lockheed Corporation bribery scandal (see Table 1) (Fisse & Braithwaite, 1983). Thus, in the case of scandals, companies seek to get things over with and behind them, and the quickest way to do so may be to offer an apology backed up by organizational and management change designed to prevent recurrence of the dubious behavior. This tactic is one Drexel, Warner, and Lambert eventually adopted in the recent insider trading scandal and that Michael Milken, a key figure in the case, finally also adopted. If Drexel and Milken had been accommodating sooner, perhaps they would have met a happier fate.

In a scandal, denying responsibility is not likely to be credible because complex, tightly coupled technological systems beyond human control do not engender scandals. Rather, they are the results of human and organizational lapses and inadequacies. Behind scandals lie greed and corruption, the failure and inability of governments to prevent white-collar crime, and the failure of corporations to police their employees. The environment that breeds scandals often is one in which excuses like "everyone is doing it" and "it is possible to get away with it" abound. Corporations may actually implicitly urge their employees to "get the job done no matter what it takes." Realistically, since the temptations are great and the stakes are high, under such circumstances even humans of great honor may succumb. Further, when people do succumb they can draw upon an arsenal of apparently irrefutable justifications. They can maintain that they acted to protect their jobs, the jobs of their fellow workers, or the viability of the national economy. As Milken said, he was acting to provide financing for a capital-starved country. His claim was that he was a pioneer in "the creation of new instruments for the financing of companies, most of which did not have access to the capital markets" (Milken, 1990: A12).

After the people involved in a scandal have written confessions and made apologies, the company involved can invoke numerous excuses. These include the desire of the corporation to fulfill its obligations to the stake-

holders that depend on it, including its customers and suppliers and the communities to whom it pays taxes. No moral absolutes, it may seem, can stand in the way of those obligations. Thus,

Hypothesis 2: When a company is involved in a scandal, its investors will respond more positively to accommodative signals than to defensive signals.

Hypothesis 3: Defensive signals will provide significantly better returns to shareholders in the case of accidents than in the case of scandals.

Hypothesis 4: Accommodative signals will provide significantly better returns to shareholders in the case of scandals than in the case of accidents.

Product safety and health incidents. Analysis of product safety and health incidents appear in Buchholz, Evans, and Wagley (1985), Fisse and Braithwaite (1983), Goodpaster (1984), Sapolsky (1986), Sethi (1977), Starling and Baskin (1985), Sturdivant (1985), and Whiteside (1972). In such incidents, no unique event creates mass suffering at a single stroke, but there are repeated events or revelations, as in the case of the safety problems with the Ford Motor Company's Pintos and the case of the long-term exposure of the Manville Corporation's employees to asbestos. Or there may simply be a threat of revelations, as in the case of the poisoned Johnson and Johnson Tylenol. Over time, such events and revelations may reveal actual or potential suffering as great and numbers of victims as large as accidents generate (Brodeur, 1985). Again, the victims are likely to be represented by legal counselors who press claims against the offending companies. The companies involved face court settlements for vast sums of money. But the victims of product safety violations do not form as identifiable and cohesive a body as the victims of accidents. The former type of group is not created in a single moment by an event of great magnitude; typically, its members only become aware that they are victims gradually as their illnesses set in and similar cases are decided in the courts. In addition, complicating circumstances may inhibit many victims of health and safety incidents from bringing their cases forward; such circumstances might include product misuse, poor or reckless driving, and heavy smoking combined with exposure to a substance like asbestos. People subject to such complications may fear that the courts will dismiss their claims after they have exposed themselves to financially and emotionally expensive court procedures.

Thus, although there are real victims aligned with an assembly of attorneys seeking to satisfy their demands in product safety cases, the actual number of victims is likely to be in dispute and to remain in dispute while the company involved deliberates about its liabilities and options. A company's motivation to deny responsibility here is clearly very great. Its officials may believe that any admissions on their part will be used against them in the courts, and admissions may only add to the number of people who feel they have wrongly suffered. Indeed, discussions, disputes, and warnings

issued within the company usually show that someone was aware of the dangers earlier than the company has been willing to admit publicly. This information may enable victims to collect large and comprehensive awards for pain, suffering, and other intangibles. The efforts of management, therefore, will be geared toward preventing the release of potentially damaging internal material. Thus, at first glance, it appears that managers can appeal to investors by means of denial.

Nonetheless, there are differences between product safety and health incidents and accidents that make it less likely that investors will believe company denials in the case of the former. The root causes of product safety and health cases are not as complex as the root causes of accidents. The interactions are not so numerous, and the coupling is not so tight. Safety incidents evolve relatively slowly, and a company usually has plenty of opportunities to recover and reverse direction, to stop or at least limit production, to recall products, or at a minimum to attach warnings to them. Thus, the company and its spokespersons cannot plausibly claim that what has taken place is a one-time "act of God" that does not implicate the company's policies, procedures, or integrity or the competence of its management.

Who the victims are and whether they will come forward is less certain in product safety cases than in accidents. Moreover, investors are not likely to believe claims that the crisis is an act of God that does not represent organizational inadequacies. Thus,

Hypothesis 5: When product safety and health incidents occur, no significant differences will exist between the reactions of a company's investors to accommodative and defensive signals.

METHODS

To test these hypotheses we identified and classified a series of post-crisis policy declarations, assessed their impacts on the stock market, and compared the market impacts of accommodative and defensive policy declarations after accidents, scandals, and product safety incidents.

Data

Identifying and classifying policy declarations. The five hypotheses developed in the prior section were tested on 112 declarations of corporate policy. To obtain the observations, we examined major case books and monographs on business and society and focused on 15 of the total of 27 crises that we found described. Table 1 lists the cases studied. We originally sought five examples of each type of crisis—accidents, scandals, and product safety and health incidents, but the original group of 27 crises had 13 scandals, 9 product safety and health cases, and only 5 accidents. Because of the small number of accidents, we included airline crashes (Davidson et al., 1987), despite the fact that the investing public is likely to know the amount

TABLE 1
Cases Analyzed

Corporation	Incident	Year
Accidents		
American Airlines	DC-10 crash in Chicago; most fatalities in U.S. air disaster	1979
General Public Utilities	Three Mile Island; worst domestic nuclear power plant accident	1979
McDonnell Douglas	DC-10 crash in Paris; most fatalities in international air catastrophe	1974
Union Carbide	Chemical explosion in Bhopal, India; nearly one-half million victims, worst in history	1984
Union Oil	Massive oil spill on coast of Santa Barbara, CA	1969
Scandals		
Exxon	Political bribery to overseas leaders in at least a half-dozen countries	1975
General Dynamics	Grand jury and Congressional investigations of numerous improprieties in Defense Department procurements	1984
ITT	Allegations of improper ties to U.S. government officials including illegal campaign contributions	1972
Lockheed	Overseas sales arrangements involving payoffs to foreign officials to win contracts for L-1011 jetliner	1975
Northrop	Charges of illegal political contributions to Richard Nixon's presidential campaign	1974
Product safety and health incidents		
Firestone	Recall of 400,000 steel-belted passenger car radials	1978
Ford	Damage awards and class action suits against Pintos followed by recall of vehicle	1978
General Motors	Controversy about auto safety ignited by Ralph Nader's charges against the Corvair	1966
Johnson & Johnson	Recall of Tylenol from market as result of cyanide deaths	1982
Procter & Gamble	Government report linking Tampons to toxic shock syndrome leading to product recall	1980

of insurance coverage airlines have since it is mandated by law and settlements are usually for the amount of coverage. The two airline crashes studied here, the Turkish Airlines crash in Paris in 1974 and the American Airlines crash in Chicago in 1979, were among the most severe in history, so

it is possible that the investing public might have believed that the coverage was not adequate.

Case studies, monographs, or both provided substantial documentation about the chronology of events for each crisis chosen. We established this selection criterion because we wanted to have sufficient background material on a particular crisis to interpret, clarify, and classify each policy declaration. In the 12 deleted cases, either background material was inadequate or the company involved was not listed on the New York Stock Exchange and could not be included because information on returns would have been missing. In one case, the Manville Corporation asbestos affair, the duration of the crisis was so long (10 years) that it was not possible to compare it to the others.

Once the crises had been identified, we searched the *Wall Street Journal Index* for specific declarations of corporate policy associated with each crisis. Other studies of corporate crises (e.g., Bromiley & Marcus, 1989; Jarrel & Peltzman, 1985) have used the *Wall Street Journal* to provide a precise, fairly accurate record of information that reached the market. Brealey and Myers (1984) posited that the market reacts instantaneously, or nearly instantaneously, to new and unanticipated information. We therefore had to judge whether each announcement of corporate policy that appeared in the *Wall Street Journal* contributed new information. Two undergraduate business majors, whom we trained and closely supervised, made these judgments. If they could not agree that an announcement contained new information, we reviewed the disputed announcement, drawing on knowledge obtained from our background reading, and excluded announcements from the analysis if we could not agree. Of the 112 observations used in the analysis, there was agreement among all four judges on 97; in the remaining instances, we and one student felt that the announcement contained new information.

The undergraduate judges also classified the presentations of corporate policy as either accommodative or defensive (cf. Marcus, 1984; Post, 1978; Sutton & Callahan, 1987; Tedeschi & Melburg, 1984). As was noted, we defined accommodative signals as those in which managers accepted responsibility, admitted to the existence of problems, and attempted to take actions to remedy a situation. They included apologies and expressions of remorse, guilt, shame, and intent to make restitution. Examples of accommodative signals were: "Union Carbide is donating nearly \$1 million in aid to the victims and is planning to set up an orphanage" and "McDonnell Douglas is accelerating a program to install a closed lock mechanism on the cargo doors of all its DC-10s in service." We defined defensive signals as those in which managers insisted that problems did not exist, tried to alleviate doubts about their and the firm's ability to generate future revenues, and took actions designed to resume normal operations rapidly. Denials of intention, volition, and agency played a large role in defensive signaling. Managers might claim, for instance, that an accident was the result of a mistake, inadvertency, or sabotage. The following were examples of defen-

sive signals: "Union Carbide suggests that sabotage was the cause of the gas-leak disaster," and "Utility defends itself against recent criticisms of the integrity of its management in the controversy over Three Mile Island." We again used the process discussed above to classify policy declarations as accommodative or defensive. Of the 112 observations used in the analysis, all judges agreed on 87; in the remaining instances, we and one student felt the announcement had been appropriately classified.

Number of observations and serial correlation. The number of observations used was in the normal range for studies of this kind: we had 112 observations, and other researchers have had from 27 to 131 (cf. Davidson et al., 1987; Davidson & Worrell, 1988; Fields & Janjigian, 1989; Hoffer, Pruitt, & Reilly, 1988; Jarrel & Peltzman, 1985; Sprecher & Pertl, 1983). In another respect, though, the data used in this study were not comparable to those in other studies because we did not concentrate on a single type of crisis. Rather, the 112 observations all concerned only 15 crises, and we assumed that each observation was independent. One problem with this assumption is that once a public announcement is made, managers may feel a need to be consistent with it in subsequent statements. Another possibility is that managers will observe the effects of their announcement on stock prices and modify their subsequent behavior. If such situations arose, announcements would be serially correlated.

Therefore, we had to try to limit this possibility. We did so by including only announcements separated by five market days, unless the information a closer announcement contained was truly novel and unanticipated. This rule was violated for only 8 observations. A further check on serial correlation is described later in this section.

Analyses

Assessing the impact of the policy declarations. We tested the impact of the 112 observations on the market using methods developed by Brown and Warner (1980, 1985). To estimate the impact on stock price changes of unanticipated announcements, it is necessary to assess the extent to which security price performance around the time of an announcement is abnormal. The abnormal, or excess, return is the part of a return not anticipated by a statistical or economic model; it is the deviation of the actual return from the model's predictions. We defined a normal, or expected, return for each policy declaration at time t as $ER_{it} = a + BR_{mt} + e_{it}$, where ER is the expected return of the policy declaration i at time t , a is the regression intercept, B is the beta coefficient of the regression, R_{mt} represents the returns of a standard market index at time t , and e_{it} is the disturbance term, or residual, for security i at time t (Fama, 1976; Reinganum, 1985). Since an announcement does not affect returns prior to an event, those returns are considered normal in relation to the announcement (Scholes & Williams, 1977). An estimation period for the prior-to-event conditions is necessary. The estimation period used here began 244 trading days before each post-crisis announcement under analysis and ended 6 days before it. We analyzed

the average impact of each announcement on the market on the day before it appeared in the *Wall Street Journal* and on the day of its appearance (Ruback, 1982, 1983; Strachan et al., 1983), calculating the abnormal return as $A_{it} = R_{it} - ER_{it}$, where A_{it} is the abnormal return for security i at time t , with the actual return, R_{it} , for security i on day t derived from its prices, and ER_{it} being the expected return. The average impact for the day of the announcement and day prior to the announcement is used because it has been shown that investors are likely to know of an event at least a day before it is published in the *Wall Street Journal*. After obtaining an excess return for each policy declaration, we conducted a t -test to analyze the significance of the excess return in terms of the probability of its occurrence.

As a check on serial correlation, we then computed regression equations using total excess return as the dependent variable and the lagged excess return as the independent variable. If serial correlation was an issue, the significance level for the t -test of the lagged excess return would have to be less than .05. We could only perform this analysis for crises with more than five announcements or the results would have been meaningless because of insufficient degrees of freedom. With one exception (Northrop), the crises examined included all the instances in which there were policy announcements less than five days apart. Crises with five or more announcements accounted for 90 of the 112 observations in the analysis. The significance of t was over .05 in all those cases. Thus, we were reasonably sure that serial correlation was not a serious problem.

Comparing crisis types. We compared the mean excess returns of subgroups of policy signals to determine if the differences between the means were significant. We examined the following six subgroups: (1) defensive and (2) accommodative announcements following accidents; (3) defensive and (4) accommodative announcements following scandals, and (5) defensive and (6) accommodative announcements following product safety and health incidents. We calculated the mean excess return and standard deviation for each subgroup and conducted t -tests to determine if the average abnormal returns for the subgroups significantly differed from each other. To test Hypothesis 1, we compared the mean excess returns for subgroups 1 and 2; for Hypothesis 2, we compared subgroups 3 and 4; for Hypothesis 3, subgroups 1 and 3; for Hypothesis 4, subgroups 2 and 4; and for Hypothesis 5, we compared subgroups 5 and 6. We used the standard deviation of the subgroups as an estimate for the standard error in the traditional t -test formula (Nachmias & Nachmias, 1976: 282).

As a further test of the hypotheses, we combined the variables into a model and introduced control variables. The model was structured with excess returns, the dependent variable, set equal to the sum of values for accommodative signals, the control variables, and an error term. For each type of crisis, a dummy variable represented the type of signal, its value set to 1 for an accommodative and 0 for a defensive signal. If the value of t was significantly negative for accident-related accommodative signals, significantly positive for scandal-related accommodative signals, and insignificant

for product safety—related accommodative signals in the presence of the control variables, we derived confidence in our results. The first control variable was a dummy variable set to 1 for an initial announcement of company policy following a crisis and set to 0 for subsequent announcements. We created this variable to determine if first announcements had a greater effect on the excess return outcome than subsequent announcements. A strong version of the efficient market hypothesis (Fama, Fisher, Jensen, & Roll, 1969) would hold that a first announcement should encapsulate an entire company response. The second control variable counted company announcements, with 1 for the first announcement, 2 for the second, and so on. We created this variable to determine if there were significant differences between the market's response to early and later announcements. The negative impact of an event itself (Fink, 1986) might cause market responses to early policy declarations to be generally negative, but responses to later announcements might be generally positive. The final control variable assigned each declaration a place in a string of accommodative or defensive responses, with 1 for the first accommodative or defensive signal, 2 for the second, and so on up to the final announcement in the string. We created this variable to determine if there were differences related to the ordering of the announcements. The efficient market theory (Fama, 1970) would suggest that the earliest announcements in a string will be the least anticipated and thus, the most effective.

RESULTS

Table 2 gives the date of each policy announcement studied, its classification, the excess return associated with it, and the results of the significance test for that return. It might appear from a quick scanning of the results that the corporate announcements had little impact on the market. However, in a group of 112 observations chance would account for significance at the .05 level or better for only 5.7 excess returns and for significance at the .01 level or better for only 1.14 returns. The number of significant excess returns we found—33 at the .05 level or better and 16 at the .01 level or better—was far greater than the likely chance distribution.

Table 3 shows the results of the tests of the five hypotheses. Hypothesis 1 states that following accidents, investors will react negatively to accommodative signals and positively to defensive signals. For accidents, the mean excess return associated with defensive policy announcements was +.89 percent, and the mean excess return for accommodative policy announcements was -.78 percent. We could not, however, reject the null hypothesis ($p = .08$). Hypothesis 2 states that following scandals, investors will react positively to accommodative signals and negatively to defensive signals. For scandals, the mean excess return of defensive policy announcements was -2.68 percent, and the mean excess return of accommodative policy announcements was +3.22 percent; thus, we rejected the null hypothesis ($p = .01$). Hypothesis 3 states that shareholders will get significantly better re-

TABLE 2
Significance of Abnormal Excess Returns Following the Announcements
of Corporate Policy

Policy Statements	Type of Signal	Abnormal Return	t
Accidents			
American Airlines			
7/18/79	Defensive	.006	0.17
General Public Utilities			
5/ 3/79	Accommodative	-.093	-8.13**
8/ 2/79	Accommodative	.024	2.05*
10/10/79	Accommodative	-.028	-2.46*
11/ 6/79	Accommodative	-.028	-2.45*
3/ 5/80	Accommodative	.028	2.43*
8/ 8/80	Accommodative	-.025	-2.23*
11/ 7/80	Accommodative	.033	2.92**
11/14/80	Accommodative	.023	2.01*
12/ 9/80	Defensive	.012	1.03
3/25/81	Defensive	-.057	-5.04**
6/ 9/81	Defensive	-.026	-2.25*
6/23/81	Accommodative	-.024	-2.09*
7/ 2/81	Defensive	.004	0.52
8/12/81	Accommodative	.078	6.83**
8/20/81	Accommodative	-.000	-0.02
11/23/81	Accommodative	-.002	-0.14
1/18/82	Accommodative	-.002	-0.18
7/ 2/82	Defensive	.004	0.32
11/ 1/82	Defensive	.077	6.74**
2/ 2/83	Accommodative	-.029	-2.56*
10/ 6/83	Defensive	.079	6.91**
11/29/83	Accommodative	.016	1.37
12/ 1/83	Defensive	.049	4.30**
3/16/84	Accommodative	.014	1.12
4/17/84	Accommodative	-.017	-1.51
5/10/84	Accommodative	-.013	-1.12
McDonnell Douglas			
3/ 7/74	Accommodative	-.051	-1.35
3/18/74	Accommodative	-.063	-1.66*
12/ 4/75	Accommodative	.020	0.53
Union Carbide			
12/10/84	Accommodative	-.089	-5.68**
12/11/84	Accommodative	-.042	-2.65**
12/19/84	Defensive	.017	1.10
12/20/84	Defensive	.029	1.84
1/ 7/85	Defensive	.031	1.95
1/11/85	Accommodative	-.007	-0.42
1/28/85	Defensive	-.013	-0.80
2/ 5/85	Defensive	-.003	-0.22
2/11/85	Accommodative	.014	0.88
2/13/85	Defensive	.031	1.95
3/ 6/85	Accommodative	-.003	-0.20
3/15/85	Accommodative	-.026	-1.68

TABLE 2 (continued)

Policy Statements	Type of Signal	Abnormal Return	t
Union Carbide (continued)			
3/19/85	Accommodative	.011	0.68
3/25/85	Accommodative	.031	1.98*
4/11/85	Defensive	.001	0.05
4/25/85	Defensive	.002	0.12
5/ 2/85	Accommodative	.007	0.43
5/30/85	Accommodative	-.014	-0.91
8/ 1/85	Defensive	-.024	-1.54
8/29/85	Accommodative	.033	2.09*
Union Oil			
2/ 7/69	Defensive	-.013	-0.69
2/14/69	Defensive	-.004	-0.22
2/20/69	Accommodative	-.018	-0.93
Scandals			
Exxon			
7/14/75	Accommodative	.002	0.08
7/16/75	Accommodative	-.028	-1.11
7/17/75	Accommodative	-.018	-0.72
7/24/75	Accommodative	.024	0.98
9/26/75	Accommodative	-.009	-0.38
11/17/75	Accommodative	-.001	-0.02
General Dynamics			
3/26/85	Accommodative	.022	0.98
5/ 3/85	Defensive	-.024	-1.06
5/23/85	Accommodative	.056	2.47*
ITT			
3/ 3/72	Accommodative	-.020	-0.99
3/ 9/72	Defensive	-.026	-1.27
7/ 8/72	Defensive	-.013	-0.61
Lockheed			
7/30/75	Defensive	-.024	-0.38
8/ 6/75	Defensive	.018	0.29
8/ 7/75	Defensive	-.024	-0.39
9/10/75	Accommodative	-.027	-0.43
10/ 1/75	Defensive	-.032	-0.50
10/ 8/75	Defensive	-.053	-0.85
2/ 6/76	Accommodative	-.046	-0.73
2/17/76	Accommodative	.055	0.87
3/ 3/76	Accommodative	.018	0.29
3/ 4/76	Accommodative	.198	3.15**
3/ 5/76	Accommodative	.266	4.23**
4/14/76	Accommodative	.051	0.81
9/ 9/76	Defensive	.021	0.33
Northrop			
5/ 7/74	Accommodative	-.011	-0.27
5/10/74	Accommodative	.032	0.77
10/15/74	Defensive	-.112	-2.74**
11/21/74	Accommodative	.048	1.18

TABLE 2 (continued)

Policy Statements	Type of Signal	Abnormal Return	t
Product safety and health incidents			
Firestone			
3/ 8/78	Defensive	-.054	-2.87**
4/14/78	Defensive	.012	0.61
7/10/78	Defensive	-.023	-1.22
7/14/78	Accommodative	-.009	-0.46
7/24/78	Accommodative	-.029	-1.54
8/ 9/78	Accommodative	-.010	-0.51
8/15/78	Defensive	-.010	-0.51
10/23/78	Accommodative	.053	2.81**
11/30/78	Accommodative	.070	3.74**
Ford			
2/ 8/78	Defensive	.018	1.31
3/20/78	Accommodative	-.003	-0.25
GM			
1/13/66	Defensive	-.016	-1.55
3/ 9/66	Defensive	.014	1.37
3/23/66	Accommodative	-.014	-1.36
8/ 8/66	Defensive	-.001	-0.08
1/ 3/67	Defensive	.029	2.82**
2/18/67	Defensive	.010	0.96
3/ 2/67	Accommodative	.004	0.43
3/20/67	Accommodative	.001	0.03
3/30/67	Accommodative	-.021	-2.02*
12/ 1/67	Accommodative	.021	2.00*
Johnson & Johnson			
10/ 4/82	Accommodative	-.051	-2.48*
10/ 8/82	Accommodative	-.021	-1.02
10/18/82	Accommodative	.013	0.64
10/25/82	Accommodative	-.047	-2.27*
11/12/82	Accommodative	.019	0.92
Procter & Gamble			
6/30/80	Defensive	-.004	-0.28
9/23/80	Accommodative	-.002	-0.15
9/29/80	Accommodative	-.009	-0.68
11/ 5/80	Defensive	.005	0.40

* $p < .05$ ** $p < .01$

turns if a company's management gives defensive signals following an accident than they will if it gives defensive signals following a scandal. The mean excess return for defensive signals following accidents was +.89 percent, and the mean excess return for defensive signals following scandals was -2.68 percent, results that negated the null hypothesis at the .05 level. Hypothesis 4 states that shareholders will get significantly better returns as a result of accommodative signals following scandals than as a result of accommodative signals following accidents. The mean excess return for ac-

TABLE 3
Results of the Tests of the Hypotheses

Type of Signal	Number of Policy Announcements	Mean Abnormal Return*	Standard Deviation	t
Hypothesis 1				
Accident-related defensive	20	0.89	3.25	
Accident-related accommodative	33	-0.78	3.51	1.76
Hypothesis 2				
Scandal-related defensive	10	-2.68	3.73	
Scandal-related accommodative	19	3.22	7.74	-2.72**
Hypothesis 3				
Accident-related defensive	20	0.89	3.25	
Scandal-related defensive	10	-2.68	3.73	2.26*
Hypothesis 4				
Accident-related accommodative	33	-0.78	3.51	
Scandal-related accommodative	19	3.22	7.74	-2.13*
Hypothesis 5				
Product safety-related defensive	12	-0.08	2.20	
Product safety-related accommodative	18	-0.19	3.03	0.11

* Returns are expressed as a percentage of market value.

* $p < .05$

** $p < .01$

commodative signals following scandals was +3.22 percent, and the mean excess return for accommodative signals following accidents was -.78 percent, negating the null hypothesis at the .05 level. The last hypothesis states that differences in investor reactions to defensive and accommodative signals following product safety and health incidents will not be significant. The mean excess return for defensive signals following health and safety incidents was -.08 percent, and the mean excess return for accommodative signals following such incidents was -.19 percent; we could not reject the null hypothesis ($p = .92$). Thus, results support four of five hypotheses and nearly support the fifth.

Table 4 presents the results of the regression analysis containing the control variables. Accident-related accommodative signals have a significant negative impact at less than the .05 level, scandal-related accommodative signals have a significant positive impact at less than the .01 level, and product safety-related accommodative signals do not have a significant effect. These results are as we expected them to be, and they support the hypotheses. The variable for the first company announcement does not have a significant effect. However, there are significant differences between earlier and later company announcements, indicated by significant results for the sequence variable at the .05 level or below. Sequential position in a string of accommodative or defensive announcements also had significance ($p < .01$). The result for the string order variable suggests that investor reactions to a crisis itself do affect policy declarations made soon after the crisis (Fink,

TABLE 4
Results of Regression Analyses^a

Variables	Parameter Estimate	Standard Error	t	Probability of t
Intercept	-.025	.010	-2.43	.02
Accident-related accommodative signal	-.021	.010	-2.08	.04
Scandal-related accommodative signal	.034	.012	2.91	.00
Product safety-related accommodative signal	-.000	.012	-0.01	.99
First company announcement	-.013	.013	-0.99	.32
Sequential place of announcement	-.006	.003	2.01	.05
String order of announcement	.002	.001	3.37	.00
Adjusted R ²	.22			
F	6.27			
Probability of F	.00			

^a N = 112.

1986). Thus, there is a halo effect, with investors generally receiving early announcements more negatively than later ones. However, the result for the string variable also indicates that investors view early signals in a string of accommodative or defensive signals more positively than later ones because the first time they hear the news about a particular event, it is unanticipated. Our findings about the impacts of accommodative signals following accidents, scandals, and product safety incidents hold despite these trends.

CONCLUSIONS AND IMPLICATIONS

In the study reported here, we attempted to extend agency and signaling theories by determining the impact on shareholders of declarations of managerial policy following crises. We examined three types of crisis and made predictions based on the effects of those crises on their victims and investors' beliefs about the crises' causes. Our results generally support predictions that significant differences exist between shareholder responses to accommodative and defensive signals from management after the three types of crisis. Accommodative signals tend to serve shareholder interests after scandals, but defensive signals tend to serve such interests following accidents. The differences between shareholder responses to accommodative and defensive policies are not significant in the case of product safety and health incidents.

These results cannot, and are not meant to, provide policy guidance for managers. Even though this study may improve their understanding of the effects of their announcements on shareholders, managers confronting an actual crisis continue to face dilemmas. If they go through the process of imaginatively rehearsing (Dewey, 1939) the consequences of the policies they consider presenting, they confront a number of options. On the one hand, they can announce policies tending to be in the interests of both the victims and shareholders. This approach corresponds to a concept of en-

lightened self-interest, which is in accord with a broad interpretation of the classic theory in which firms may embrace additional interests so long as the claims do not conflict with the claims of shareholders (Friedman, 1962). As we have shown, accommodative policies following a scandal generally fit this pattern: shareholders and the diffuse victims of a scandal are both served when managers present an accommodative policy. Managers wishing to serve both the interests of victims and shareholders would be foolish to be anything but accommodative. However, following an accident, managers who imaginatively rehearsed the consequences of their announcements would face a more difficult dilemma. They would have to decide which stakeholders to favor—the victims or the shareholders. An accommodative policy would tend to benefit the former, but a defensive policy would benefit the latter. The tenet that managers should maximize shareholder returns within the bounds of law and ethics provides them no guidance on what to do as it does not say how to reconcile conflicts between ethics and profits.

In our opinion, under such circumstances managers should adopt a rigorous ethical position in which they lay prudence aside and sacrifice profits for the sake of the victims of a crisis. Especially after product safety and health incidents, when there is no predictable market reaction and managers have no way of knowing how investors will respond, managers should act on the basis of moral conviction.

It is worth considering further the meaning of the ambiguous product safety and health results. One critical factor may be that our analysis examined only short-term effects. The outcomes of the Ford Pinto and Johnson and Johnson Tylenol cases are now known. Ford executives were defensive until forced to admit that there were problems with the vehicle. Johnson and Johnson executives, on the other hand, remained accommodative throughout the incident, even though our data show that their firm suffered considerable stock market damage. The initial stock market impact on Johnson and Johnson was quite negative, but in the long term the actions of the company's management earned the firm respect and helped it gain back market share in a remarkably short time, given the nature of the problem. Ford, in contrast, suffered reputational damage. It also had to pay large awards to the victims, which hurt the company financially. These cases suggest that it may take many years before the true impact of managerial actions can be understood. The instrument used in this study for estimating market impact emphasizes short-term effects; under assumptions of perfect market efficiency, researchers should take long-term effects into account, but unfortunately the information available is not perfect, and long-term effects are not always predictable. Assumptions of perfect market efficiency, moreover, have come under increasing criticism (Bromiley, Govekar, & Marcus, 1987); but little can be done about this problem, for even if longitudinal data were available they would likely be contaminated by confounding variables.

Additional research on policy announcements would therefore be welcome, as this study raises many important questions. Is there a way to estimate the long-term market effect of policy declarations? Can our results be

replicated with a different group of observations? For example, would a different time frame make a difference? And to what extent are the findings culture-bound as well as time-bound—would managers and shareholders in another country, such as Japan, react similarly?

In sum, this study suggests that there may be circumstances in which it is right for managers to ignore stockholders and put other considerations first. Stockholders should not necessarily be the sole determinant of the goodness of a particular policy. We disagree with the following statement by Lee Iacocca: "Confession is good for the soul, and when you offend someone, even unintentionally, it feels good to say 'I'm sorry.' But when there's a chance that you might end up in court, you'd better think twice" (1984: 141). Rather, we believe that it is necessary to think more about what will cause managers to empathize with the victims of a crisis and what will induce them to follow their conscience and adhere to moral principle even when they know that doing so might not be in the interests of shareholders (Deak, 1989).

REFERENCES

- Akerloff, G. 1970. The market for "lemons": Qualitative uncertainty and the market mechanism. *Quarterly Journal of Economics*, 84: 488–500.
- Alexander, G., Benson, G., & Kampmeyer, J. 1984. Investigating the valuation effects of announcements of voluntary corporate selloffs. *Journal of Finance*, 34: 503–517.
- Alexander, G. J., Benson, G. P., & Gunderson, E. W. 1986. *Asset redeployment: Trans World Corporation's spinoff of TWA*. Unpublished paper, School of Management, University of Minnesota, Minneapolis.
- Ansberry, C. 1987. Forgive or forget: Firms face decision whether to apologize for their mistakes. *Wall Street Journal*, November 24: 31.
- Barzel, Y. 1976. Some fallacies in the interpretation of information costs. *Journal of Law and Economics*, 82: 291–307.
- Beatty, R. P., & Zajac, E. J. 1987. CEO change and firm performance in large corporations: Succession effects and manager effects. *Strategic Management Journal*, 8: 305–319.
- Bettis, R. 1983. Modern financial theory, corporate strategy, and public policy. *Academy of Management Review*, 8: 406–416.
- Bettis, R. A., & Weeks, D. 1985. *Measuring the financial impact of strategic interaction: The case of instant photography*. Working paper no. 85-402, Cox School of Business, Southern Methodist University, Dallas.
- Bhattacharya, S. 1979. Imperfect information, dividend policy, and the bird-in-the-hand fallacy. *Bell Journal of Economics*, 10: 259–271.
- Bhattacharya, S. 1980. Nondissipative signaling structures and dividend policy. *Quarterly Journal of Economics*, 95: 2–23.
- Bies, R. J. 1987. The predicament of injustice: The management of moral outrage. In L. L. Cummings & B. M. Staw (Eds.), *Research in organizational behavior*, vol. 9: 289–319. Greenwich, CT: JAI Press.
- Bies, R. J. 1988. Managing conflict before it happens: The role of accounts. In M. A. Rahim (Ed.), *Managing conflict: An interdisciplinary approach*: 83–91. New York: Praeger.
- Bies, R. J., Shapiro, D. L., & Cummings, L. L. 1988. Causal accounts and managing organizational conflict. *Communication Research*, 4: 381–399.

- Boulton, D. 1978. *The grease machine*. New York: Harper & Row.
- Brealey, R., & Myers, S. 1984. *Principles of corporate finance* (2d ed.). New York: McGraw-Hill Book Co.
- Brodeur, P. 1985. *Outrageous misconduct: The asbestos industry on trial*. New York: Pantheon.
- Bromiley, P., Govekar, M., & Marcus, A. 1987. *On using event study methodology in strategic management research*. Discussion paper #67, Strategic Management Research Center, University of Minnesota, Minneapolis.
- Bromiley, P., & Marcus, A. 1989. The deterrent to dubious corporate behavior: Profitability, probability and safety recalls. *Strategic Management Journal*, 10: 233-250.
- Brown, S. J., & Warner, J. B. 1980. Measuring security price performance. *Journal of Financial Economics*, 8: 205-258.
- Brown, S. J., & Warner, J. B. 1985. Using daily stock returns. *Journal of Financial Economics*, 14: 3-31.
- Browning, L. D. 1988a. Interpreting the Challenger disaster: Communication under conditions of risk and liability. *Industrial Crisis Quarterly*, 2: 211-227.
- Browning, L. D. 1988b. *A grounded theory of plausible deniability: Communicating under conditions of decision risk*. Paper presented at the annual meeting of the Academy of Management, Los Angeles.
- Browning, L. D. 1989. *Managing blame in the Iran-Contra affair: The role of plausible deniability*. Paper presented at the annual meeting of the Academy of Management, Washington, DC.
- Buchholz, R., Evans, W., & Wagley, R. 1985. *Management responses to public issues: Concepts and cases in strategy formulation*. Englewood Cliffs, NJ: Prentice-Hall.
- Carroll, A. B. 1989. *Business and society*. Cincinnati: South-Western Publishing Co.
- Cummings, L. L., & Anton, R. 1988. *The logical and appreciative dimensions of accountability*. Discussion paper #100, Strategic Management Research Center, University of Minnesota, Minneapolis.
- Davidson, W. N., Chandy, P. R., & Cross, M. 1987. Large losses, risk management and stock returns in the airline industry. *Journal of Risk and Insurance*, 57: 162-172.
- Davidson, W. N., & Worrell, D. L. 1988. The impact of announcements of corporate illegalities on shareholder returns. *Academy of Management Journal*, 31: 195-200.
- Deak, I. 1989. Jews, Catholics, Nazis & the Holocaust. *The New York Review of Books*, 36: 14, 63-72.
- Dewey, J. 1939. *Ethics*. Chicago: University of Chicago Press.
- Fama, E. F. 1970. Efficient capital markets: A review of theory and empirical work. *Journal of Finance*, 25: 383-417.
- Fama, E. F. 1976. *Foundations of finance*. New York: Basic Books.
- Fama, E. F. 1980. Agency problems and the theory of the firm. *Journal of Political Economy*, 88: 288-307.
- Fama, E. F., Fisher, L., Jensen, M. C., & Roll, R. 1969. Adjustment of stock prices to new information. *International Economic Review*, 10: 1-21.
- Fields, M. A., & Janjigian, V. 1989. The effect of Chernobyl on electric-utility stock prices. *Journal of Business Research*, 18: 81-87.
- Fink, S. 1986. *Crisis management: Planning for the inevitable*. New York: American Management Association.
- Fisse, B., & Braithwaite, J. 1983. *The impact of publicity on corporate offenders*. Albany: State University of New York Press.
-

- Fombrun, C., & Shanley, M. 1990. What's in a name? Reputation building and corporate strategy. *Academy of Management Journal*, 33: 233–258.
- Franklin, R. 1986. *The defender: The story of General Dynamics*. New York: Harper & Row.
- Freeman, R. E. 1984. *Strategic management: A stakeholder approach*. Marshfield, MA: Pitman.
- Friedman, M. 1962. *Capitalism and freedom*. Chicago: University of Chicago Press.
- Gaskins, R. H. 1989. *Environmental accidents: Personal injury and public responsibility*. Philadelphia: Temple University Press.
- Godson, J. 1975. *The rise and fall of the DC-10*. New York: David McKay.
- Goffman, E. 1961. *Encounters*. Indianapolis: Bobbs Merrill.
- Goffman, E. 1969. *Strategic interaction*. Philadelphia: University of Pennsylvania Press.
- Goffman, E. 1974. *Frame analysis*. New York: Harper Colophon.
- Goffman, E. 1981. *Forms of talk*. Philadelphia: University of Pennsylvania Press.
- Goodpaster, K. 1984. *Ethics in management*. Boston: Harvard University Graduate School of Business Administration.
- Hirsch, P. M., Friedman, R., & Koza, M. R. 1990. Collaboration or paradigm shift? Caveat emptor and the risk of romance with economic models for strategy and policy research. *Organizational Science*, 1: 87–97.
- Hoffer, G. E., Pruitt, S. W., & Reilly, R. J. 1988. The impact of product recalls on the wealth of sellers: A reexamination. *Journal of Political Economy*, 96: 663–670.
- Iacocca, L. 1984. *Iacocca: An autobiography*. New York: Bantam Books.
- Jarrel, G., & Peltzman, S. 1985. The impact of product recalls on the wealth of sellers. *Journal of Political Economy*, 93: 512–536.
- Jensen, M., & Meckling, W. 1976. Theory of the firm: Managerial behavior, agency costs, and ownership structure. *Journal of Financial Economics*, 3: 305–360.
- Jervis, R. 1970. *The logic of images in international relations*. Princeton, NJ: Princeton University Press.
- Johnson, O. F. 1974. *Ethics*. New York: Holt, Rinehart & Winston.
- Jovanovic, B. 1981. Truthful disclosure of information. *Bell Journal of Economics*, 12: 36–44.
- Keir, A. E., Mann, D. E., & Olsen, P. G. 1972. *Oil pollution and the public interest: A study of the Santa Barbara oil spill*. Berkeley, CA: Institute of Government Studies, University of California.
- Kemeny, J. 1979. *The need for change: The legacy of TMI*. Washington, DC: U.S. Government Printing Office.
- Landes, W. M., & Posner, R. A. 1987. *The economic structure of tort law*. Cambridge, MA: Harvard University Press.
- Leland, H., & Pyle, D. H. 1977. Informational asymmetries, financial structure, and financial intermediation. *Journal of Finance*, 32: 371–387.
- Lieberman, J. 1981. *The litigious society*. New York: Basic Books.
- Litan, R. E., & Winston, C. (Eds). 1988. *Liability: Perspectives and policy*. Washington, DC: Brookings Institution.
- Litschert, R., & Nicholson, E. 1977. *The corporate role and ethical behavior: Concepts and cases*. New York: Petrocelli/Charter.
- MacAvoy, P. W. 1981. The business lobby's wrong business. In T. G. Marx (Ed.), *Business and society*: 158–164. New York: Prentice-Hall.

- Marcus, A. A. 1984. *The adversary economy*. Westport, CT: Quorum Books.
- Marcus, A. A. 1986. Compensating victims for harms caused by pollution and other hazardous substances. *Law and Policy*, 8: 189-213.
- Marcus, A. A., & Goodman, R. S. 1986. Compliance and performance: Toward a contingency theory. *Research in Corporate Social Performance and Policy*, 8: 193-221.
- Marcus, A. A., & Goodman, R. S. 1989. Corporate adjustments to catastrophe: A study of investor reaction to Bhopal. *Industrial Crisis Quarterly*, 3: 213-234.
- Meyers, G. C. 1986. *When it hits the fan: Managing the nine crises of business*. Boston: Houghton Mifflin.
- Milken, M. 1990. Text of Michael Milken's statement in court. *Wall Street Journal*, April 25: A12.
- Mirrlees, J. 1971. An exploration of optimum income taxation. *Review of Economic Studies*, 38: 175-208.
- Montgomery, C., Thomas, A., & Kamath, R. 1984. Divestiture, market valuation, and strategy. *Academy of Management Journal*, 27: 830-840.
- Nachmias, D., & Nachmias, C. 1976. *Research methods in the social sciences*. New York: St. Martin's Press.
- Nelson, P. 1974. Advertising as information. *Journal of Political Economy*, 82: 729-752.
- Peavey, J. W. III. 1984. Modern financial theory, corporate strategy and public policy: Another perspective. *Academy of Management Review*, 9: 152-157.
- Perrow, C. 1984. *Normal accidents*. New York: Basic Books.
- Porter, M. 1980. *Competitive strategy*. New York: Free Press.
- Post, J. 1978. *Corporate behavior and social change*. Reston, VA: Reston Publishing.
- Preston, L., & Post, J. 1975. *Private management and public policy*. Englewood Cliffs, NJ: Prentice-Hall.
- Rappaport, A. 1981. Selecting strategies that create shareholder value. *Harvard Business Review*, 81(3): 139-149.
- Rappaport, A. 1983. Corporate performance standards and shareholder value. *Journal of Business Strategy*, 4: 28-38.
- Reinganum, M. R. 1985. The effect of executive succession on stockholder wealth. *Administrative Science Quarterly*, 30: 46-60.
- Riley, J. 1975. Competitive signaling. *Journal of Economic Theory*, 10: 174-186.
- Ross, S. A. 1977. The determination of financial structure: The incentive signaling approach. *Bell Journal of Economics*, 8: 23-40.
- Ruback, R. S. 1982. The effect of discretionary price control decisions on equity values. *Journal of Financial Economics*, 10: 83-105.
- Ruback, R. S. 1983. The Cities Service takeover: A case study. *Journal of Finance*, 38: 319-330.
- Sampson, A. 1973. *The sovereign state of ITT*. New York: Stein & Day.
- Sapolsky, H. M. 1986. *Consuming fears*. New York: Basic Books.
- Schelling, T. 1963. *Strategy of conflict*. New York: Oxford University Press.
- Schipper, K., Thompson, R., & Weil, R. L. 1987. Disentangling interrelated effects of regulatory changes on shareholder wealth: The case of motor carrier deregulation. *Journal of Law and Economics*, 30: 7-100.
- Scholes, M., & Williams, J. 1977. Estimating betas from nonsynchronous data. *Journal of Financial Economics*, 5: 309-327.

- Schramm, W. 1948. *Communications and modern society*. Urbana: University of Illinois Press.
- Sethi, S. P. 1977. *Up against the corporate wall* (3d ed.). Englewood Cliffs, NJ: Prentice-Hall.
- Sharplin, A. 1985. Union Carbide of India Ltd.: The Bhopal tragedy. *Case Research Journal*, 23: 229-248.
- Shrivastava, P. 1987. *Bhopal: Anatomy of a crisis*. Cambridge, MA: Ballinger.
- Sitkin, S. B., & Bies, R. J. 1988. *The architecture of explanation: The use of social accounts in conflict situations*. Paper presented at the annual meeting of the Academy of Management, Anaheim, CA.
- Spence, M. A. 1973. Competitive and optimal responses to signals: An analysis of efficiency and distribution. *Journal of Economic Theory*, 7: 296-332.
- Spence, M. A. 1974. *Market signaling: Information transfer in hiring and related screening processes*. Cambridge, MA: Harvard University Press.
- Sprecher, C. R., & Pertl, M. A. 1983. Large losses, risk management and stock prices. *Journal of Risk and Insurance*, 27: 107-117.
- Spudeck, R. E., & Moyer, R. C. 1989. A note on the stock market's reaction to the accident at Three Mile Island. *Journal of Economics and Business*, 41: 235-240.
- Starling, G., & Baskin, O. 1985. *Issues in business and society: Capitalism and public purpose*. Boston: Kent Publishing.
- Strachan, J. L., Smith, D. B., & Beedles, W. 1983. The price reaction to alleged corporate crime. *Financial Review*, 18: 121-132.
- Sturdivant, F. 1985. *The corporate social challenge: Cases and commentaries*. Homewood, IL: Richard D. Irwin.
- Sutton, R. I., & Callahan, A. L. 1987. The stigma of bankruptcy: Spoiled organizational image and its management. *Academy of Management Journal*, 30: 405-437.
- Tedeschi, J. T., & Melburg, V. 1984. Impression management and influence in the organization. *Research in the Sociology of Organizations*, 3: 31-58.
- Westley, B., & MacLean, A. 1970. A conceptual model for communications research. In K. Sereno & C. Mortensen (Eds.), *Foundations of communication theory*: 73-83. New York: Harper & Row.
- Whiteside, T. 1972. *The investigation of Ralph Nader*. New York: Arbor House.

Alfred A. Marcus received his Ph.D. degree at Harvard University. He is currently an associate professor in the Carlson School of Management, Department of Strategic Management and Organization, University of Minnesota. His research interests include the impact of ethics, public policy, and global competition on strategic management with special emphasis on crisis-prone organizations.

Robert S. Goodman received his Ph.D. degree at the University of Minnesota. He is currently assistant professor in the Policy Area of the Faculty of Administrative Studies, York University, Toronto. His research interests include strategies for the U.S. financial services industry, the impacts of domestic and international environmental factors on strategy formulation, and differences in the negotiating styles of North American and Eastern European managers.

TURBULENCE AT THE TOP: A NEW PERSPECTIVE ON GOVERNANCE STRUCTURE CHANGES AND STRATEGIC CHANGE

JERRY GOODSTEIN

Washington State University, Vancouver

WARREN BOEKER

Columbia University

Organizational theorists have traditionally focused attention on the relationship between chief executive officer (CEO) succession and strategic change. This study extends that perspective and explores the effects of changes in an organization's management, ownership, and board of directors on the process of strategic change. The results of this research suggest that changes in ownership and board have significant independent and interactive effects on strategic change.

Over the past 15 years, the dialogue concerning the dynamics of organizational change has shifted from a focus on controversy about whether organizations can adapt (Aldrich & Pfeffer, 1976; Child, 1972) to a more profitable focus on the conditions under which organizations are likely to make fundamental changes in strategies, structures, and internal processes (Boeker, 1989; Carroll, 1984; Ginsberg & Buchholz, 1990; Hannan & Freeman, 1984; Meyer, 1975; Pfeffer & Salancik, 1978; Tushman & Romanelli, 1985). A central assumption for the theorists cited is that inertial forces that constrain change exist in organizations. Researchers have focused little attention, however, on the specific conditions under which organizations can overcome inertial forces.

A number of theorists (Carlson, 1961; Helmich & Brown, 1972; Meyer, 1975; Pfeffer & Salancik, 1978; Tushman & Romanelli, 1985) have argued that the process of executive succession provides an important mechanism through which organizational inertia can be overcome, particularly when

This research was supported in part by grants from the Investors in Business Education, School of Commerce and Business Administration, University of Illinois, and the Executive Leadership Research Center, Graduate School of Business, Columbia University. We would like to thank Ellen Auster, James Fredrickson, Donald Hambrick, Ming Jer Chen, Huseyin Leblebici, Joseph Mahoney, Michael Tushman, David Whetten, and two anonymous reviewers for this journal for their helpful suggestions and comments. In addition, we wish to thank John Delaney for providing methodological advice and Bert Cannella, Sara Keck, Sue Clark, and Rick Metzger for their research assistance.

the successor is an outsider. Through overcoming internal resistance and strategic myopia, new executives are able to facilitate an organization's response to environmental changes.

Prior studies have uniformly emphasized the importance of the power vested in a company's CEO without concomitant attention to the power its owners or board of directors might independently hold. Although focusing on CEO dynamics may be necessary for understanding organizational change, a more complete and sufficient explanation requires that executive succession be examined in the context of other changes in a corporation's governance structure. We significantly extend previous work by considering how the broader governance structure, defined as ownership and board interests, (1) provides an important context that moderates the effect of CEO succession on organizational change and (2) exerts effects on organizational change that are independent of CEO succession. Expanding the focus beyond CEOs provides an opportunity to identify alternative mechanisms that can overcome organizational inertia.

Although there are different ways of defining organizational inertia (Hannan & Freeman, 1984), clearly one of its more important indexes is the extent to which an organization is able to initiate strategic change. Following Ginsberg (1988), we adopted a definition of strategic change that emphasizes changes in product and service domains. Through both adding and divesting new products and services, organizations alter their domains. These product-service changes represent critical decisions that not only affect the boundaries of the organizations, but also the allocation of resources within them. For these reasons, changes in governance structure are likely to have an important effect on the magnitude of major changes in products and services.

In order to explore these relationships and capture the dynamics of strategic change over time, we examined changes in hospital services for over 300 hospitals during a six-year period, 1980–86. We related changes in the governance structures of hospitals to subsequent changes in the scope of services they provided. Changes in the health care environment, hospital performance, and administrative structure were also incorporated into the research design in order to examine explicitly the importance of governance structure changes in the context of other critical causal forces. Our focus on the hospital sector reduces the risk of overgeneralization noted by Ginsberg (1988) and yet allows for examining the dynamics of strategic change in an industry that has experienced significant turbulence as a result of regulatory changes, increased competition, and pressure for more efficient performance (Fennell & Alexander, 1989).

In the following section we elaborate the theoretical arguments that link governance structure changes to strategic change. Because the relationship between ownership and board changes as determinants of strategic change has received little attention, we first develop these relationships. We then incorporate the effect of CEO succession into the arguments, specifically

addressing its interaction with changes in ownership and the board of directors. We then apply these arguments to the hospital industry in order to develop specific operational hypotheses.

THEORETICAL FRAMEWORK

Governance Structure as a Context for Strategic Change

Theorists have long argued that organizations can and do respond to important changes in their environment by initiating strategic changes (Child, 1972; Pfeffer & Salancik, 1978; Tushman & Romanelli, 1985). Shifts in regulatory (Smith & Grimm, 1987) or technological environments (Tushman & Anderson, 1986) motivate important strategic changes in organizations. In addition to environmental changes, declines in performance may also motivate changes in strategy (Schendel, Patton, & Riggs, 1976; Tushman, Virany, & Romanelli, 1989), particularly if changes in the external environment accompany changes in performance (Harrigan, 1981; Oster, 1982).

Although environmental and performance conditions may motivate strategic change, there are also important external and internal barriers to change. For example, industry barriers may preclude both a firm's entry into new markets and its exit from current markets (Harrigan, 1981; Oster, 1982). There are also important causal forces in organizations that increase resistance to change and make adaptation problematic; those forces include vested interests and political resistance (Hannan & Freeman, 1984; Pfeffer & Salancik, 1978; Tushman & Romanelli, 1985).

One important internal source of political resistance may be the prevailing distribution of power in an organization. Over time, individuals and groups gain power through their ability to cope with important environmental contingencies (Crozier, 1964; Hickson, Hinings, Lee, Schneck, & Penning, 1971; Pfeffer & Salancik, 1978). The perpetuation of power, although providing continuity and stability, also constrains the flexibility with which an organization can respond to new environmental contingencies or changes in performance. Those individuals or groups most likely to lose power and resources resist changes in the existing distribution of power (Pfeffer & Salancik, 1978). Stability in a firm's executive structure also increases insulation, emphasis on cohesion, and commitments to previous courses of action (Brady & Helmich, 1984; Meyer, 1975; Tushman & Romanelli, 1985).

What then allows organizations to overcome these constraints? Theorists have argued that executive change, in particular change in a company's CEO and top management team, provides an important mechanism for overcoming inertia and political resistance (Pfeffer & Salancik, 1978; Tushman & Keck, 1989; Tushman & Romanelli, 1985). The process of executive succession—particularly one in which an outsider becomes CEO—provides an opportunity for existing power relationships to be altered and for new strategic perspectives to be introduced. Empirical research findings (Carlson,

1961; Helmich & Brown, 1972; Meyer, 1975; Tushman et al., 1989) in general have supported the significance of executive succession and top-management-team changes in stimulating major organizational changes.

However, it is unlikely that chief executive change is the only factor that might create conditions for strategic reassessment and change. Surprisingly, very few studies (Carroll, 1984, and Boeker, 1989, are exceptions) have looked beyond the CEO to consider how changes in the broader governance structure of a firm, specifically its ownership and board of directors, affect strategic change. Therefore, although there is some degree of knowledge about how CEO succession affects strategic change, very little is known about the independent effects of ownership and board changes on strategic change.

This lack of attention may reflect a bias of organizational researchers toward the assumption that ownership interests and a firm's board of directors have relatively little influence over the process of strategic change. Decisions about altering products or services and changing market position are seen as falling within the purview of the CEO and top management team (Ginsberg, 1988). This is not an unreasonable assumption, but it may be a limiting one. There are compelling reasons why the board of directors and owners of a company might be likely to directly and indirectly influence strategic decisions on products and services.

First, as Mizruchi (1983) noted, a company's board of directors is in a position to establish the parameters within which strategic decision making occurs. The board of directors is legally liable for strategic outcomes and hence must evaluate strategic performance in light of shareholder interests. Baysinger and Hoskisson (1990) posited two major vehicles for controlling managerial performance with respect to strategic decisions: strategic controls and financial controls. Strategic controls involve the evaluation of management performance on the basis of both the desirability of initial strategic plans and the degree to which management has met strategic objectives. Financial controls involve evaluation of the extent to which management has met financial targets. Baysinger and Hoskisson further argued that the choice of controls is likely to be based on the composition of a company's board. Strategic controls require extensive knowledge of the internal strategic decision-making process of a firm and hence are more likely to be implemented when a significant number of board members are insiders. Financial controls require more objective information for evaluating strategic performance and hence are more likely to be used when outsiders predominate. A board's composition and control emphasis will motivate management to adopt specific strategies. For example, where outsiders dominate and financial controls are emphasized, there will be an incentive to maximize short-term financial performance, through, for instance, high levels of diversification.

Second, a board of directors may directly intervene in a company's strategic planning and decision-making process. In numerous organizations,

ownership interests or the board of directors may be actively involved in issues of strategy and organization. Hospitals and voluntary organizations, for example, have a relatively small management component. In essence, the management team is the CEO and board of directors. In these organizations, owners and boards of directors are likely to be as concerned with strategic direction as with monitoring managerial performance (Fennell & Alexander, 1989).

Finally, there are critical periods, even in major corporations, when boards of directors may assume a more direct role in strategic issues affecting products of services. When an organization is young (Brady & Helmich, 1984; Schoonhoven, Eisenhardt, & Lyman, 1990) or encountering crises in its evolution (Fennell & Alexander, 1989; Mizruchi, 1983; Zald, 1969), its board of directors may play a particularly important and direct role in influencing strategic change. Boards of directors may also be directly involved in major shifts in corporate strategy, such as those associated with strategic reorientations (Tushman & Romanelli, 1985). At these important periods of organizational evolution, changes in ownership, the composition of the board of directors, or both may have a critical impact on the kinds of strategic changes examined in this study. It is therefore critical to view the influence of owners and boards of directors on strategic change as variable across different organizational sectors and different stages of organizational growth and decline.

Given the possibility of an important link between ownership interests, boards of directors, and strategic change, it is critical to outline the underlying mechanisms through which changes in those groups may affect strategic change. Our central argument is that ownership and board changes may substantially alter the context within which strategic decisions are made. Following Tushman and Romanelli (1985), we argue that in organizations social structures are created on the basis of patterns of interdependence. These social structures exist not only within top managements and throughout organizations, but also among executives, owners, and boards of directors. The "reciprocation of mutual favors among directors and executives" (Kosnik, 1987: 167) furthers the degree of interdependence and stability within a company's governance structure. In turn, governance structure stability promotes convergence on an established strategic orientation and resistance to change, even when environmental changes or performance declines occur (Pfeffer & Salancik, 1978; Tushman & Romanelli, 1985).

Therefore, as can CEO succession, changes in its ownership or board of directors can significantly alter an organization's social structure through two major mechanisms. First, changes in the composition and structure of ownership or board can overcome internal political resistance and disrupt existing bases of power. Second, such changes can increase responsiveness to environmental changes or performance conditions. New perspectives may be introduced into the strategic decision-making process, thereby facilitating an increased awareness of changing environmental and performance condi-

tions. We discuss each process in greater depth, focusing on how it pertains specifically to ownership and board changes.

Ownership Change

There are a number of ways in which changes in ownership can directly affect a strategic decision-making context and hence, strategic change. Of particular interest is the extent to which ownership changes lead to more or less concentration of control in the hands of management. Theorists have argued that managerial control insulates management (Berle & Means, 1932); it weakens "the linkage between environmental conditions and organizational behavior, and is associated with increased executive tenure, increased stability of the executive team, and idiosyncratic perceptions of environmental opportunities and constraints" (Tushman & Romanelli, 1985: 210). When a company's ownership control is concentrated among its top managers, they can act opportunistically (Williamson, 1975) and have little or no accountability for their performance. For example, Salancik and Pfeffer (1980) found that in firms in which management ownership was comparatively high, CEOs were able to maintain their positions even when firm performance was poor. Changes in ownership that reduce the degree of control managers exercise will allow a company to consider a broader range of strategic options, even options not necessarily in management's interest (Salancik & Pfeffer, 1980).

A second consideration is changes in ownership involving fundamental transfers of control, such as occur when one firm merges with or acquires another firm. Although there has been relatively little empirical research on the implications of major changes in control, the existing work suggests that they have some important consequences. Carroll (1984) found that transfers of control in newspaper organizations—particularly those involving a shift from control by an owner-manager to a more corporate form of ownership—increased failures. More recently, Walsh (1988) examined the consequences of mergers and acquisitions on top management teams and found that changes in ownership significantly increased top-management-team turnover, particularly among high-level executives. Walsh did not directly examine subsequent changes in strategy following ownership changes, but it is plausible that the top-management-team changes accompanying ownership changes may have been an outcome of new strategic priorities that threatened incumbent CEOs. In a study of semiconductor companies, Boeker (1989) found some evidence that ownership changes resulting in a transfer of control away from founders were more likely than other ownership changes to be associated with fundamental changes in strategic orientation. Finally, Ginsberg and Buchholz (1990) found some anecdotal evidence suggesting that in response to important changes in federal policies in 1983, some health maintenance organizations were able to convert from nonprofit to for-profit status, alter their distribution of ownership through using employee stock options and other means, and facilitate important changes in organizational performance.

Although the above arguments suggest that changes in ownership structures affect the process of strategic change primarily through altering an existing distribution of control, strategic change may also occur because ownership changes allow the introduction of new perspectives into a strategic decision-making process. The longer ownership concentration and control has been stable, the more likely it is that there will be convergence among owners regarding norms, values, and decision-making procedures (Tushman & Romanelli, 1985). Over time, owners may become insulated from environmental and performance changes and fail to perceive and react to critical environmental and organizational changes. Important changes in ownership can disrupt this stability and increase owner vigilance with respect to environmental change and organizational performance.

Directorial Change

Changes in a company's board of directors can also influence strategic change independent of change in CEO. Of particular importance are changes in board composition and structure that alter the mix of inside and outside board members. Through its governance role, a board of directors safeguards the interests of organizational stakeholders (Baysinger & Butler, 1985; Williamson, 1975, 1985). A board is expected to exert control over important organizational decisions, some of which may not be in management's interest (Baysinger & Hoskisson, 1990; Fama & Jensen, 1983).

The composition of a board is a critical determinant of its ability to carry out its governance responsibilities effectively (Baysinger & Butler, 1985; Fama & Jensen, 1983; Williamson, 1975, 1985). Outside board members are more likely than insiders to act in a manner representative of stockholder interests (Fama & Jensen, 1983; Kosnik, 1987). The greater the representation of management on the board, the greater the degree of managerial discretion (Williamson, 1964, 1975) and the likelihood that executives will act opportunistically. With regard to strategic change, opportunism may imply that managers will initiate strategic changes not necessarily in shareholders' interests, such as unrelated diversification (Amihud & Lev, 1981), or pay "greenmail" (Kosnik, 1987). In a greenmail transaction, a company repurchases stock from a dissident shareholder or group of shareholders who threaten top management's position of control (Kosnik, 1987). Managerial opportunism may also take the form of lack of strategic change, as when managers persist in existing courses of action and strategic directions and, for example, fail to divest themselves of unprofitable entities (Harrigan, 1983).

Changes in board composition, specifically, increases in outsider representation, may motivate strategic changes as new actions initiated by the board overcome managerial opportunism and persistence. CEOs clearly do influence the selection of outside board members (Herman, 1981; Mace, 1971; Pfeffer, 1981), but boards of directors still hold final authority with respect to major organizational and strategic changes like acquisitions and replacement of the CEO. There is evidence that outsider-dominated boards

will initiate substantial changes, even if they are in conflict with the interests of incumbent CEOs (Brady & Helmich, 1984; Kimberly & Zajac, 1988; Mizruchi, 1983).

Like changes in insider-outsider composition, turnover on a board of directors may affect the strategic change process. As Brady and Helmich noted, "The tendency of boards not to change at all is in itself a threat to constructive change strategies" (1984: 88). Turnover on a board may lead to the incorporation of new interests and perspectives into the board's decision-making process, which may reduce the risk of strategic myopia associated with excessive stability and homogeneity of perspectives (Hambrick & Mason, 1984; Staw, 1980; Tushman & Romanelli, 1985).

The Interactive Effects of Governance Structure Changes on Strategic Change

Having presented separate arguments that changes in ownership and boards of directors have important independent effects on strategic change, we now consider the interactive effects of those changes, especially when they occur in conjunction with CEO succession. As noted above, analysts have tended to view the effects of CEO succession on strategic change in isolation from other governance structure changes, creating a serious gap in the literature. Given that a CEO's power is an important function of a company's existing ownership and board structure (Kimberly & Zajac, 1988; Mizruchi, 1983; Salancik & Pfeffer, 1980), at a minimum organizational researchers should be concerned with how board and ownership changes might affect a new CEO's ability to either initiate or deter strategic change. Concurrent changes in the governance structure of an organization can significantly alter the context within which a new CEO shapes and implements strategic change.

Where ownership and board interests have been stable, it is likely that relationships have formed and interests become vested in maintaining certain patterns of organizational activities (Pfeffer & Salancik, 1978; Tushman & Romanelli, 1985). Even if a new CEO proposes strategic changes, they may be resisted if they are not consistent with the interests of other executives, owners, and board members. Persistence of ownership and board interests therefore represents a potential barrier to a CEO's effectiveness in initiating strategic change.

For example, we noted above that insider control of a board of directors may deter strategic change. Inside board members are likely to have a greater vested interest than outside board members in maintaining existing patterns of organizational policies and structures: "History, precedent, and widespread commitments to the status quo are reinforced by those executives whose career interests are best served by stability and incremental change" (Tushman & Romanelli, 1985: 212). Therefore, within a board where insiders dominate, a new CEO may face resistance to organizational changes that disrupt the prevailing distribution of power. Changes in the composition of the board that increase outsider representation may allow the new CEO to

overcome insiders' resistance and create greater latitude for the new CEO's initiation of strategic change.

Ownership and board changes also increase a new CEO's latitude for initiating change by supporting new perspectives on strategic change. Just as a new CEO often enters an organization with a mandate for change (Brady & Helmich, 1984), new owners and board members may also be predisposed to initiate strategic changes. The new CEO may therefore be able to gain both political and philosophical support for recommendations to initiate strategic change.

Timing critically affects the potential impact of these joint changes. To the extent that governance structure changes occur concurrently, or in the same year, there is a greater opportunity for a cohort effect to arise among the new members of that structure (McCain, O'Reilly, & Pfeffer, 1983; Wagner, Pfeffer, & O'Reilly, 1984). As McCain and colleagues suggested, "Within cohorts there exists the opportunity for the development of group solidarity and sponsorship in the contest for resources and control" (1983: 623). Concurrent changes in owners, directors, or both may provide a new CEO with important allies to support strategic change.

HYPOTHESES

Our hypotheses concern the hospital industry, which has changed dramatically in the past ten years. In contrast to earlier periods, today a high degree of competition and extreme pressure from public and private interests to control costs characterize that environment (Fennell & Alexander, 1989). Those pressures intensified as a result of the implementation of the Medicare Prospective Payment System (PPS) in 1983, a change in legislation that established ceiling rates on specific medical procedures, thus shifting the burden of cost control to hospitals. Hospitals were previously buffered from poor performance, but these environmental changes exacerbated problematic hospital performance resulting from poor use of resources or inefficiencies and the high costs of providing hospital services.

These competitive and regulatory changes acted as important environmental jolts (Meyer, 1982) and motivated hospitals to make important strategic changes in services, both through additions and divestitures. Hospitals diversified and developed new lines of business (Shortell, Morrison, Hughes, Friedman, & Vitek, 1987). In addition, they consolidated existing services by divesting themselves of those they could no longer provide profitably or efficiently.

Despite the importance and pervasiveness of these service changes, little is known regarding the role played by governance structure changes in determining their scope or magnitude. Hospital governance structures also underwent significant changes during this period. As the environment became more turbulent and uncertain, volatility in hospital management, ownership, and board structures increased.

As noted earlier, organizations may initiate strategic change—alter their

market position—both by adding new products and services and by withdrawing from specific markets. Both actions are therefore important independent components of strategic change. It is also important to differentiate additions and divestitures since these independent types of changes may be subject to different internal pressures. A series of studies on the dynamics of organizational change (Freeman, 1979; Freeman & Hannan, 1975; Hannan & Freeman, 1978) first pointed out that there are important differences in the political dynamics underlying organizational expansion and contraction. Although expanding the domain of a hospital is likely to engender comparatively little resistance, a decision to subtract services may generate conflict as specific interest groups attempt to consolidate and retain acquired resources and control. Administrative interests may attempt to centralize control and prevent changes that reduce their influence in an organization (Hannan & Freeman, 1978). Resistance to change may increase as groups perceive the threat of a potential loss of resources and power (Staw, Sandelands, & Dutton, 1981).

Hospital Ownership

The hospital sector contains four primary types in terms of ownership: (1) government-owned and operated hospitals (e.g., state, district, and county facilities); (2) hospitals owned and operated by religious denominations, (3) private nonprofit hospitals, and (4) private for-profit hospitals. Changes in hospital ownership involving shifts between these groups are extremely rare. Rather, ownership changes are more likely to occur as a function of other events. First, they may occur when hospitals merge. Hospital mergers have increased significantly over the past ten years (National Center for Health Services Research, 1988). Second, ownership changes may occur as a result of acquisition by a multihospital system. Multihospital systems, organizations that own or operate two or more hospitals (National Center for Health Services Research, 1988), have grown rapidly since the mid 1970s and now control over 40 percent of the total hospital population (National Center for Health Services Research, 1988). Third, ownership changes may occur as ownership control is transferred from an individual or ownership group to a new owner, as might occur in a for-profit hospital. Finally, in for-profit hospitals the concentration of ownership can change.

Following the arguments developed above, we posited that changes in ownership will affect changes in hospital services. Each ownership change can alter the strategic decision-making context in a hospital by shifting power and control. This is particularly true when a fundamental ownership change—a transfer of control—occurs. For example, once a multihospital system acquires a hospital, it may attempt to implement procedures, policies, and strategic changes consistent with the mission of the system as well as the hospital. And the merging of hospitals may require a new strategic plan with new priorities for either one or both hospitals (Starkweather & Carman, 1988).

Hypothesis 1: Changes in a hospital's ownership due to fundamental transfers of control will increase the number of service additions and divestitures the hospital initiates.

Hospital Boards of Directors

Although for the most part the governance role of corporate boards of directors is fairly clear, the structure and role of hospitals' boards varies depending on whether they have a corporate or a philanthropic structure (Fennell & Alexander, 1989). Corporate hospital boards tend to be relatively small, homogeneous with respect to their members' backgrounds, and oriented toward strategic activity. Philanthropic boards are larger, more diverse, and oriented toward asset preservation.

As the health care environment has become more dynamic, hospitals have been motivated to alter the composition and structure of their boards of directors. In addition to their traditional function of linking facilities with their external environments (Pfeffer, 1973), hospital boards have assumed a strong role in rendering decisions affecting operations and strategic directions and have become more accountable for performance and operations (Fennell & Alexander, 1989).

These fundamental changes in their role should increase turnover on hospital boards as hospitals adapt to new environmental changes and performance contingencies. Membership changes will increase the likelihood that new perspectives will enter the strategic decision-making process.

Hypothesis 2: Turnover on a hospital's board of directors will increase the number of service additions and divestitures the hospital initiates.

An important consideration is whether turnover leads to other changes in the structure of a board, specifically in the representation of inside and outside board members. For example, if five of nine board members leave and insiders fill all the vacancies, turnover could lead to less strategic change. It is therefore important to consider the extent to which changes in composition due to turnover affect the underlying structure of a board. Important theoretical arguments support the importance of outside board members as catalysts for strategic change. In the context of the hospital industry, environmental changes have given hospitals a strong impetus to recruit strategically oriented outsiders, such as business executives.

Hypothesis 3: Increases in the proportion of outside board members on its board will increase the number of service additions and divestitures a hospital initiates.

Finally, the effects of changes in ownership and board composition will be greatest when they interact with CEO succession.

Hypothesis 4: The interaction of changes in a hospital ownership and a change of chief executive will increase

the number of service additions and divestitures the hospital initiates.

Hypothesis 5: The interaction of changes in the composition of a hospital's board due to turnover and a change of chief executive will increase the number of service additions and divestitures the hospital initiates.

Hypothesis 6: The interaction of changes in the structure of a hospital's board due to an increase in outsiders and a change of chief executive will increase the number of service additions and divestitures the hospital initiates.

Finally, the changes in the health care sector noted above—notably, the introduction of the prospective payment system—provide an important context for considering the effects of governance structure changes on hospital service additions and divestitures. We expected changes in competition, governmental funding of health care, and variations in hospital performance associated with changes in hospital occupancy to exert direct effects on strategic change in hospitals (Shortell et al., 1987).

Hypothesis 7: Increases in the degree of competition in its market environment will increase the number of service additions and divestitures a hospital initiates.

Hypothesis 8: The implementation of the Medicare Prospective Payment System will increase the number of service additions and divestitures a hospital initiates.

Hypothesis 9: Declines in hospital occupancy will increase the number of service additions and divestitures a hospital initiates.

RESEARCH DESIGN

Tests of our hypotheses were conducted in the period 1980–86 on 327 hospitals in California. We obtained data from the California Health Facilities Commission's (CHFC) annual disclosure survey. The CHFC has surveyed all California hospitals since 1976 on such areas as ownership and management, financial status, and service delivery. We directed our attention to hospitals in Standard Metropolitan Statistical Areas (SMSA) in order to explore the issues discussed above in a market context (Fennell, 1980).

Although 398 SMSA hospitals were surveyed, it was necessary to eliminate 71 hospitals because data were incomplete. An investigation of these hospitals indicated no systematic exclusion based on ownership form or size. We were also unable to use data from before 1980 as information on boards of directors was not available.

Dependent Variables

As noted above, we adopted a definition of strategic change in this study that is centrally concerned with changes in the breadth of products or ser-

vices an organization offers. In order to determine the magnitude of those changes, we assessed both the number of service additions and service divestitures the hospitals studied initiated. The services examined varied widely from direct, intensive ones such as providing acute care surgery to ancillary ones such as providing a pharmacy. The CHFC survey included data on the availability of 162 services.

Service additions were noted when a hospital indicated the availability of a service not previously provided in the prior year. An addition could occur either by the hospital directly providing the new service or by establishing a contractual relationship with another provider. For each year, we determined the number of new services each hospital added and summed them to create the dependent variable. In turn, a service divestiture was noted when the survey indicated that a hospital no longer provided a service either it or an external provider had previously offered. Once again, for each year we developed a summary measure of the total service divestitures based on the 162 services included in the CHFC survey.

It is important to note that our measures essentially treat each service change equally. Instead, we could have attempted to determine the magnitude of service changes by determining the relative importance of services for each hospital. It is possible that a given hospital's decision to add a single service represents a highly significant change, but in terms of our measure, this change would appear to be of less magnitude than another hospital's addition of three comparatively minor services. Unfortunately, it is particularly difficult to determine the relative magnitudes of service changes. The importance of a given service is a function of, among other things, a hospital's dependence on the service in terms of its revenue contribution, the availability of the service through other hospitals or providers in a community, the symbolic importance of the service to physicians in the hospital, and the interdependence of the given service with other services.

This problem is, however, one that also applies to studies of corporate strategic change involving diversification and divestiture activity. Typically, researchers measure the extent of such activity using aggregate measures that do not capture product-specific characteristics (e.g., Harrigan, 1983; Tushman & Keck, 1989). Despite the limitations of such broad measures, it seems reasonable to assume that as the breadth of change—the number of product or service changes initiated in a given year—increases, the overall strategic change represented is likely to be more radical than incremental (Tushman & Keck, 1989). It is with respect to such encompassing strategic changes that the governance structure changes discussed above are particularly critical.

Independent Variables

We developed the following measures for each hospital to take into account various changes in governance structure.

CEO change. CEO successions were coded for each year in the study. Because we lacked data on the origins of new CEOs, we were not able to distinguish between internal and external succession.

Ownership change. We determined changes in ownership involving the transfer of control from one individual, group, or organization to another individual, group, or organization. Comparing the names of owners from year to year allowed us to see if a change had occurred, but we were not able to determine the exact nature of each ownership change from the CHFC data. For example, if XYZ Inc. acquired a hospital, we knew that an ownership transfer had occurred, but we didn't know if XYZ Inc. was a sole proprietor, a group of physicians, or a large, integrated multihospital system.

Board composition changes. We computed the proportion of new members on a board of directors as a result of turnover from one year to the next. Hospitals vary with regard to restrictions on board member service. Hospitals adopting what Fennell and Alexander (1989) called a corporate board structure, which features small size, relatively low diversity, and a strong focus on strategic issues, tend to limit the number of consecutive terms a board member may serve. In contrast, hospitals with a philanthropic board structure (e.g., larger size, greater diversity, and a stronger focus on resource acquisition and environmental linkage) tend to have no limits on the number of consecutive terms a board member may serve. Therefore, the turnover measure may in part reflect changes due to the expiration of terms of service.

As the initial distribution of this variable deviated significantly from normal assumptions, we used a square root transformation to make the distribution conform more closely to conventional statistical assumptions.

Change in the proportion of inside members. We computed changes in the proportion of management staff members on boards of directors from year to year. To differentiate the effects of a change in that proportion from the actual level of management representation, we also included a measure of the proportion of managers represented following a change on a board of directors. For example, if in 1981 management representation increased from 25 percent (in 1980) to 40 percent, we included both the change score (+15%) and the current level (40%).

It was possible to determine whether changes in governance structure occurred in a given year, but it was not possible to determine the order in which they occurred. Thus, we could not test whether the sequence of governance structure changes occurring one year was an important determinant of the scope of strategic change in the next year.

Environmental changes and hospital performance. The study included two measures of market competition in Standard Metropolitan Statistical Areas (SMSA).

The first was change in hospital bed capacity. In general, excess capacity in a market increases competition (Harrigan, 1983). Growth in bed capacity puts pressure on hospitals to use facilities and services efficiently. Although regulation of bed capacity in California might reduce the likelihood of excess, hospitals can use a multitude of exemptions to expand their numbers of beds (Simpson, 1986).

The second measure, PPS implementation, was a dummy variable in-

cluded to capture the 1983–85 period. During this period, the Medicare Prospective Payment System (PPS) was introduced and implemented.

Control Variables

Finally, we included number of variables to account for differences among hospitals.

Total services. We included this measure to control for variations in the ranges of services offered and to capture differences in hospitals' sizes. Because the correlation between total services and hospital beds was high (.72), we decided to include just the service measure.

Hospital form. Hospitals were differentiated on the basis of their ownership structures, with for-profit, not-for-profit, religious, and government ownership as categories. Prior studies (Shortell et al., 1987) have shown that patterns of hospital service changes vary with control structure.

Data Analysis

The data were analyzed using a pooled time series and cross-sectional structure. To test the causality of our arguments explicitly, we used a lagged structure (one time period) for the independent variables. We analyzed data on a total of 327 hospitals over four waves in the study, examining service changes in the periods 1981–82, 1982–83, 1983–84, and 1984–85. The analyses therefore included a total of 1,308 observations. Each model was estimated using a weighted generalized least-squares procedure developed by Kmenta (1986) that corrects for autocorrelation and heteroscedasticity.

Four sets of analyses were conducted for both service additions and service divestitures. In the first model, we examined the independent effects of ownership and board changes on service changes. With the other models, we tested the interactive effects of CEO changes and (1) ownership changes, (2) turnover among directors, and (3) changes in outsider representation. In each of these models, we took environmental and performance characteristics into account.

Although we were primarily interested in the effects of CEO succession and other changes in governance structure, we explored possible interaction effects with ownership and board changes. There were no interactive effects posited for either additions or divestitures. We also confined the analyses to two-way interaction effects in order to reduce the problem of multicollinearity among the variables.

RESULTS

Table 1 shows the descriptive statistics for the dependent, independent, and control variables.

Tables 2 and 3 present the analytic results. The four models presented in each table correspond to the major sets of hypotheses outlined earlier. We first discuss these results with respect to the hypotheses regarding governance structure changes.

TABLE 1
Descriptive Statistics^a

Variables	Means	Standard Deviations	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. Total service additions	7.31	8.17																
2. Total service divestitures	8.38	6.45	.23*															
Governance structure																		
3. CEO change	0.25	0.43	.06*	.08*														
4. Ownership change	0.07	0.26	.14*	.08*	.20*													
5. Board composition change	11.81	10.44	.08*	.01	.08*	.08*												
6. Change in percent-age of managers on board	0.01	0.15	.01	.01	.06*	.01	.16*											
7. CEO × ownership	0.04	0.20	.14*	.12*	.36*	.73*	.01	-.01										
8. CEO × board composition	3.44	8.22	.05*	.07*	.71*	.13*	.45*	.12*	.23*									
9. CEO × percent-age of managers	0.01	0.10	-.03	-.01	.08*	-.01	.10*	.65*	-.01									
Environment and performance																		
10. Change in SMSA bed capacity	-0.01	0.01	-.01	-.01	-.02	-.03	.02	-.02	.01	.01	-.02							
11. PPS implementation	0.50	0.50	-.01	-.02	.07*	-.04	.05*	.02	.03	.09*	.01	-.06*						
12. Change in occupancy	-1.75	12.16	.04	-.01	-.01	-.16*	.05*	.02	-.16*	.03	-.02	.05*	-.08*					
Control variables																		
13. Percentage of managers on board	0.23	0.32	.08*	.15*	.06*	.05*	.14*	.27*	.07*	.09*	.20*	-.01	.04	.02				
14. Total services	79.34	25.39	-.16*	-.07*	-.06*	-.10*	.02	-.01	-.09*	-.05	-.01	.01	.07*	-.01	-.25*			
15. Religious ownership	0.05	0.22	-.06*	-.03	-.02	-.04	-.01	.03	-.03	-.03	.04	-.01	.01	-.01	.24*	.11*		
16. Not-for-profit ownership	0.43	0.49	-.01	-.14*	-.12*	-.07*	-.01	-.06*	-.08*	-.10*	-.05	-.01	.01	-.04	-.39*	.35*	-.21*	
17. For-profit ownership	0.37	0.48	.10*	.19*	.15*	.13*	.11*	.06*	.14*	.16*	.04*	-.01	-.01	.01	.46*	-.39*	-.18*	-.67*

^a N = 1,308.

* p < .05

TABLE 2
Weighted Generalized-Least-Squares Estimates of the Effects of
Governance Structure Changes on Hospital Service Additions^a

Variables	Model 1	Model 2	Model 3	Model 4
Constant	10.10 (0.70)	10.59 (0.68)	10.63 (0.70)	10.01 (0.72)
Lagged service changes	-0.14 (0.15)	-0.23 (0.14)	-0.13 (0.16)	-0.09 (0.16)
Control variables				
Percentage of managers on board	1.55* (0.56)	1.81* (0.58)	1.56* (0.58)	1.60* (0.61)
Total services	-0.05* (0.01)	-0.05* (0.01)	-0.05* (0.01)	-0.05* (0.01)
Religious ownership	-0.11 (0.77)	-0.51 (0.74)	-0.23 (0.78)	-0.23 (0.79)
Not-for-profit ownership	2.19* (0.31)	2.06* (0.28)	2.13* (0.31)	2.20* (0.32)
For-profit ownership	1.63* (0.38)	1.58* (0.36)	1.59* (0.38)	1.51* (0.39)
Governance structure				
CEO change	0.33* (0.12)	0.11 (0.12)	0.11 (0.20)	0.24 (0.13)
Ownership change	2.52* (0.22)	0.89* (0.31)	2.64* (0.23)	2.50* (0.24)
Board composition change	0.03* (0.01)	0.04* (0.01)	0.03* (0.01)	0.03* (0.01)
Change in percentage of managers on board	-1.61* (0.65)	-2.02 (0.68)	-1.76* (0.69)	0.03 (0.82)
CEO × ownership		1.85* (0.57)		
CEO × board composition			0.01 (0.01)	
CEO × percentage of managers				-2.89* (0.85)
Environment and performance				
Change in SMSA bed capacity	-0.56 (3.97)	-0.51 (4.06)	-0.34 (4.08)	-0.67 (4.24)
PPS implementation	0.07 (0.09)	0.03 (0.09)	0.03 (0.10)	0.01 (0.10)
Change in occupancy	0.02* (0.01)	0.03* (0.01)	0.02* (0.01)	0.02* (0.01)
F	40.27*	32.63*	37.88*	36.60*

^a Coefficients are unstandardized; standard errors are in parentheses. N = 1,308.

* p < .05

The first three hypotheses predicted that changes in hospital ownership, board composition, and board structure would significantly increase the scope of strategic change and service additions and divestitures. The results presented in model 1 provide partial support for these hypotheses. Changes in ownership due to transfers of hospital control have a significant, positive

TABLE 3
Weighted Generalized-Least-Squares Estimates of the Effects of
Governance Structure Changes on Hospital Service Divestitures*

Variables	Model 1	Model 2	Model 3	Model 4
Constant	7.82 (1.12)	7.80 (1.06)	7.82 (1.12)	7.95 (1.13)
Lagged service changes	-0.22* (0.11)	-0.23* (0.10)	-0.22* (0.11)	-0.23* (0.11)
Control variables				
Percentage of managers on board	2.08* (0.39)	1.90* (0.38)	2.09* (0.39)	2.19* (0.40)
Total services	-0.01* (0.01)	-0.01* (0.01)	-0.01 (0.01)	-0.01* (0.01)
Religious ownership	-1.33* (0.49)	-1.36* (0.49)	-1.35* (0.49)	-1.41* (0.49)
Not-for-profit ownership	-0.46 (0.30)	-0.57 (0.29)	-0.48 (0.30)	-0.46 (0.30)
For-profit ownership	2.69 (0.34)	2.72* (0.32)	2.69* (0.34)	2.64* (0.34)
Governance structure				
CEO change	0.60* (0.09)	0.39* (0.09)	0.57* (0.14)	0.62* (0.10)
Ownership change	1.24* (0.17)	-0.05 (0.21)	1.24* (0.17)	1.25* (0.16)
Board composition change	0.01 (0.01)	0.01 (0.01)	0.01 (0.01)	0.01 (0.01)
Change in percentage of managers on board	-0.42 (0.28)	-0.41 (0.25)	-0.43 (0.28)	-0.23 (0.36)
CEO × ownership		2.18* (0.33)		
CEO × board composition			0.01 (0.01)	
CEO × percentage of managers				-0.46 (0.68)
Environment and performance				
Change in SMSA bed capacity	-1.07 (2.69)	-2.54 (2.33)	-1.17 (2.71)	-1.18 (2.71)
PPS implementation	-0.23* (0.11)	-0.25* (0.10)	-0.24* (0.11)	-0.24* (0.11)
Change in occupancy	0.01 (0.01)	0.01 (0.01)	0.01 (0.01)	-0.01 (0.01)
F	41.48*	36.65*	39.23*	39.05*

* Coefficients are unstandardized; standard errors are in parentheses. N = 1,308.

* p < .05

effect on service additions and divestitures. Changes in board composition due to turnover and increases in outsider representation on a board have a significant, positive effect on service additions but not on divestitures.

In addition to positing independent effects for each of these governance structure changes on hospital service additions and divestitures, in Hypoth-

eses 4, 5, and 6 we predicted that there would be interactive effects between CEO changes and ownership, board composition, and board structure. The results in model 2 indicate that joint changes in CEO and ownership have a significant, positive effect on service changes. Joint changes in board turnover and CEO do not appear to have an effect on service changes. Finally, the results in model 4 suggest that joint changes in outsider representation and CEO have a positive and significant effect on service additions but not on divestitures.

The effects of environmental and performance changes were somewhat mixed. Although changes in bed capacity had no effect on either additions or divestitures (Hypothesis 7), regulatory change did influence strategic change. The implementation of PPS (Hypothesis 8) significantly reduced divestitures but did not have as strong an effect on additions. Declines in hospital occupancy (Hypothesis 9), rather than motivating service additions, had a significant, negative effect on additions. We found no relationship between performance changes and service divestitures.

DISCUSSION

The major objective of this research was to explore an expanded model of strategic change considering not only the effects of CEO succession but also the effects of changes in ownership and boards of directors. Our prediction was that changes in ownership and board independently affect the process of strategic change and create a context that moderates the effects of CEO succession. Researchers often view these elements in isolation, but their interdependencies are critical in shaping the magnitude and direction of strategic change.

This research indicated that the interaction of changes in ownership and management have an important effect on strategic change. Concurrent changes in hospital ownership and management were significant catalysts to both service additions and divestitures. The ability of a hospital's new CEO to initiate change, particularly with respect to expansion, also appeared to be a function of changes in the structure of its board of directors. When an increase in outsiders on a board accompanied chief executive change, there was a significant expansion of hospital services.

These results provide support for viewing CEO leadership and discretion as contingent variables that will vary across situational contexts and specific outcomes (Gupta, 1988). A wide variety of environmental, organizational, and individual characteristics (Gupta, 1988; Hambrick & Finkelstein, 1987) are likely to affect a CEO's influence on strategic change. Our findings suggest that among the more important organizational variables likely to influence the discretion of a new CEO are the structure and composition of an organization's ownership and board of directors and concurrent changes in those variables.

Joint changes in governance structures are important, but a compelling additional insight of this study is that ownership and board changes can

directly influence strategic change independent of CEO succession. Changes in ownership associated with transfers of control had significant effects on both service additions and divestitures. In addition, changes in board composition and structure also had independent effects on service additions.

These results provide strong support for incorporating ownership and board changes into general models of strategic and organizational change (Pfeffer & Salancik, 1978; Tushman & Romanelli, 1985). In theory and in practice, organizational researchers have narrowly defined dominant organizational coalitions as primarily including CEOs and top management teams. To the extent that researchers continue to focus solely on CEO and top-management-team dynamics, they will continue to overlook important alternative causal sources of strategic change.

In the case of the health care sector, researchers have traditionally viewed hospital boards as mechanisms for linkage to the external environment (Pfeffer, 1973). However, as the health care environment has become increasingly competitive and dynamic, the role of hospital boards has shifted, and they have become much more directly involved in issues of strategic change (Fennell & Alexander, 1989). Changes in the structure and composition of their boards have therefore assumed much greater significance for hospitals' strategy.

Is it likely that the set of dynamics that influences the relationship between hospital boards and strategic change has similar influence with respect to corporate boards and strategic change? As noted earlier, there are some important differences in the structures and functions of corporate and hospital boards. A major difference is the locus of responsibility for initiating strategic change. Hospitals rely on their managements, physicians, and directors to provide direction regarding strategic changes. But for most corporate entities, the CEO and the top management team assume responsibility for strategic changes like those discussed in this study. Therefore, it is reasonable to expect that the kinds of relationships found in this study might not emerge in an examination of corporate boards and their influence on corporate strategic change.

The degree to which corporate boards influence strategic change may depend on such factors as the age of an organization and whether it is in a period of growth or decline. During such periods, the role and power of a corporate board may grow to cope with critical events. For example, as Schoonhoven and colleagues (1990) argued, board composition is particularly critical for recently founded high-technology companies. They argued that having many outsiders on a board—particularly representatives of venture capital firms—might influence the degree to which there is pressure to develop products rapidly and get them to market. Therefore, although our findings do not necessarily suggest a strict parallel between corporate and health care organizations, they may point to a need to expand existing perspectives on the dynamics of corporate board structure and composition with respect to strategic change.

The results of this study did not confirm earlier arguments in some important ways. First, changes in the composition and structure of boards of directors had no interactive or independent effects on service divestitures. Paradoxically, this research suggests that the level of management representation on a board is a catalyst to strategic change: the greater the proportion of insiders on a hospital board, the greater was the number of both service additions and divestitures.

Differences between hospitals and corporations may be important in explaining this pattern of findings. Although researchers have directed most theoretical attention to the negative implications of managerial control in a corporate context, in other contexts insider control may be less problematic. For example, hospitals, and more broadly, in the not-for-profit sector, having a high proportion of insiders on a board—and hence a unified coalition—can help reduce the fragmented board decision making that is associated with unclear ownership, a high level of constituency politics, and vague measures of success (Fennell & Alexander, 1989). In addition, managerial control may help overcome resistance to change on the part of powerful internal groups, such as physicians in hospitals.

Such a dynamic may be particularly important in highly professional organizations like hospitals in which there is a fragmented “political economy” (Zald, 1970) and the existence of multiple sources of power can hamper decision making. Although physicians are likely to support additions of services and the adoption of technological innovations (Lee, 1971; Warner, 1978), they may resist service divestitures. Unless management can exert an influence at the board level, hospitals may not make controversial decisions such as those concerning service divestitures and may not be able to adapt effectively to environmental and performance contingencies.

A number of extensions of this research can be suggested. Expanding existing models of strategic change to incorporate ownership and board interests should provide researchers with an opportunity to broaden current research on top-management-team demography (Hambrick & Mason, 1984; Wagner et al., 1984). We found evidence that demographic changes—turnover in a governance structure and associated cohort effects—were important antecedents to strategic change. These results support focusing on the demography of broad governance teams and relating dimensions of this demography, such as turnover, to specific outcomes like product-service innovation and diversification (Hambrick & Mason, 1984; O'Reilly & Flatt, 1989; Staw, 1980).

An additional extension of this study would be explicit examination of the implications of variations in the timing of these critical governance structure changes. Researchers are becoming increasingly concerned with the political context affecting major organizational outcomes such as CEO succession (cf. Fredrickson, Hambrick, & Baumrin, 1988) and broad organizational change (Tushman & Romanelli, 1985). The timing of governance structure changes, which we could not precisely determine here, can have a

significant effect on the political dynamics of strategic change, particularly with respect to a new CEO's ability to develop a broad coalition to support change.

Changes in board composition following succession may allow a new CEO to make strategic board replacements that can complement changes the CEO makes in the top management team (Tushman et al., 1989) and create a powerful context for initiating strategic change. In other situations, the effects of CEO succession will be greater following a governance structure change such as transfer of ownership. New owners are likely to have an active role in selecting a new CEO, and this high level of vested interest in the new CEO may enhance the owner's commitment to subsequent recommendations for change.

Finally, we noted above the strong effects of joint CEO and ownership changes on strategic changes in hospitals. What was not clear, given our data limitations, was whether types of ownership change are differentially likely to lead to strategic change. It would be useful to extend this research design to explore joint ownership and CEO changes in the context of the current wave of takeovers and acquisitions in the corporate sector. A prevailing rationale for takeovers and ownership changes is that they will allow organizational restructuring and presumably improve performance. Although some research has examined firm performance following acquisition (cf. Walsh, 1988), little effort has been directed toward understanding what, if any, strategic changes are likely to be initiated after changes in ownership. Our results clearly suggest that ownership transfers have important independent and joint effects in motivating strategic change.

This research should provide a strong impetus for researchers to move beyond existing models of strategic change to begin extensively exploring the effects of governance structure changes on strategic change. As is evident, important issues remain to be addressed.

REFERENCES

- Aldrich, H. A., & Pfeffer J. 1976. Environments of organizations. *Annual Review of Sociology*, 2: 79-105.
- Amihud, Y., & Lev, B. 1981. Risk reduction as a managerial motive for conglomerate mergers. *Bell Journal of Economics*, 12: 650-667.
- Baysinger, B. D., & Butler, H. N. 1985. Corporate governance and the board of directors: Performance effects of changes in board composition. *Journal of Law and Economics*, 1: 101-124.
- Baysinger, B.D., & Hoskisson, R. E. 1990. The composition of boards of directors and strategic control: Effects on corporate strategy. *Academy of Management Review*, 15: 72-87.
- Berle, A. A., Jr., & Means, G. C. 1932. *The modern corporation and private property*. New York: Macmillan.
- Boeker, W. B. 1989. Strategic change: The effects of founding and history. *Academy of Management Journal*, 32: 489-516.
- Brady, G. F., & Helmich, D. L. 1984. *Executive succession*. Englewood Cliffs, NJ: Prentice-Hall.

- Carlson, R. O. 1961. Succession and performance among school superintendents. *Administrative Science Quarterly*, 6: 210-227.
- Carroll, G. R. 1984. Dynamics of publisher succession in newspaper organizations. *Administrative Science Quarterly*, 29: 93-113.
- Child, J. 1972. Organization structure, environment and performance: The role of strategic choice. *Sociology*, 6: 2-21.
- Crozier, M. 1964. *The bureaucratic phenomenon*. Chicago: University of Chicago Press.
- Fama, E. F., & Jensen, M. C. 1983. Separation of ownership and control. *Journal of Law and Economics*, 26: 301-325.
- Fennell, M. L. 1980. The effects of environmental characteristics on the structure of hospital clusters. *Administrative Science Quarterly*, 25: 485-510.
- Fennell, M. L., & Alexander, J. A. 1989. Governing boards and profound organizational change in hospitals. *Medical Care Review*, 46: 157-189.
- Fredrickson, J., Hambrick, D. C., & Baumrin, S. 1988. A model of CEO dismissal. *Academy of Management Review*, 13: 255-270.
- Freeman, J. H. 1979. Going to the well: School district administrative intensity and environmental constraint. *Administrative Science Quarterly*, 24: 119-133.
- Freeman, J. H., & Hannan, M. T. 1975. Growth and decline processes in organizations. *American Sociological Review*, 40: 215-228.
- Ginsberg, A. 1988. Measuring and modeling changes in strategy: Theoretical foundations and empirical directions. *Strategic Management Journal*, 9: 559-575.
- Ginsberg, A., & Buchholz A. 1990. Converting to for-profit status: Corporate responsiveness to radical change. *Academy of Management Journal*, 33: 445-477.
- Gupta, A. K. 1988. Contingency perspectives on strategic leadership: Current knowledge and future research directions. In D. C. Hambrick (Ed.), *The executive effect: Concepts and methods for studying top managers*: 141-179. Greenwich, CT: JAI Press.
- Hambrick, D. C., & Finklestein, S. 1987. Managerial discretion: A bridge between polar views of organizational outcomes. In L. L. Cummings & B. M. Staw (Eds.), *Research in organizational behavior*, vol. 9: 396-406. Greenwich, CT: JAI Press.
- Hambrick, D. C., & Mason, P. A. 1984. Upper echelons: The organization as a reflection of its top managers. *Academy of Management Review*, 9: 193-200.
- Hannan, M. T., & Freeman, J. H. 1978. Internal politics of growth and decline. In M. Meyer & Associates (Eds.), *Environments and organizations*: 175-199. San Francisco: Jossey-Bass.
- Hannan, M. T., & Freeman, J. H. 1984. Structural inertia and organizational change. *American Sociological Review*, 49: 149-164.
- Harrigan, K. R. 1981. Deterrents to divestiture. *Academy of Management Journal*, 21: 306-323.
- Harrigan, K. R. 1983. *Strategies for vertical integration*. Lexington, MA: D. C. Heath & Co.
- Helmich, D. L., & Brown, W. B. 1972. Successor type and organizational change in the corporate enterprise. *Administrative Science Quarterly*, 17: 371-381.
- Herman, E. S. 1981. *Corporate control, corporate power*. New York: Cambridge University Press.
- Hickson, D. J., Hinings, C. R., Lee, C. A., Schneck, R. H., & Pennings, J. M. 1971. A strategic contingencies theory of intraorganizational power. *Administrative Science Quarterly*, 16: 216-229.
-

- Kimberly, J. R., & Zajac, E. J. 1988. The dynamics of CEO/board relationships. In D. C. Hambrick (Ed.), *The executive effect: Concepts and methods for studying top managers*: 179–205. Greenwich, CT: JAI Press.
- Kmenta, J. 1986. *Elements of econometrics*. New York: Macmillan.
- Kosnik, R. D. 1987. Greenmail: A study of board performance in corporate governance. *Administrative Science Quarterly*, 32: 163–185.
- Lee, M. L. 1971. A conspicuous production theory of hospital behavior. *Southern Economic Journal*, 38: 48–58.
- McCain, B. E., O'Reilly, C. A., III, & Pfeffer, J. 1983. The effects of departmental demography on turnover: The case of a university. *Academy of Management Journal*, 26: 626–641.
- Mace, M. L. 1971. *Directors: Myth and reality*. Boston: Harvard University Press.
- Meyer, A. 1982. Adapting to environmental jolts. *Administrative Science Quarterly*, 27: 515–537.
- Meyer, M. 1975. Leadership and organizational structure. *American Journal of Sociology*, 81: 514–542.
- Mizruchi, M. 1983. Who controls whom? An examination of the relation between management and boards of directors in large American corporations. *Academy of Management Review*, 8: 426–435.
- National Center for Health Services Research. 1988. *The role of market forces in the delivery of health care: Issues for research*. Rockville, MD: U.S. Department of Health and Human Services.
- O'Reilly, C. A., III, & Flatt, S. 1987. *Executive team demography, organizational innovation, and firm performance*. Working paper, School of Business Administration, University of California, Berkeley.
- Oster, S. 1982. Intraindustrial structure and the ease of strategic change. *Review of Economics and Statistics*, 64: 376–383.
- Pfeffer, J. 1973. Size, composition and function of hospital boards of directors: A study of organization-environment linkage. *Administrative Science Quarterly*, 18: 349–364.
- Pfeffer, J. 1981. *Power in organizations*. Boston: Pitman.
- Pfeffer, J., & Salancik, G. R. 1978. *The external control of organizations*. New York: Harper & Row.
- Salancik, G. R., & Pfeffer, J. 1980. Effects of ownership and performance on executive tenure in U.S. corporations. *Academy of Management Journal*, 23: 653–664.
- Schendel, D. E., Patton, G. R., & Riggs, J. 1976. Corporate turnaround strategies: A study of profit decline and recovery. *Journal of General Management*, 3: 3–11.
- Schoonhoven, C. B., Eisenhardt, K. M., & Lyman, K. 1990. Speeding products to market: The impact of organizational and environmental conditions on waiting time to first product introduction in new firms. *Administrative Science Quarterly*, 35: 177–207.
- Shortell, S. M., Morrison, E. M., Hughes, S. L., Friedman, B. S., & Vitek, J. L. 1987. Diversification of health care services: The effects of ownership, environment, and strategy. In R. Scheffler (Ed.), *Advances in health economics and health services*: 76–94. Greenwich, CT: JAI Press.
- Simpson, J. B. 1986. *Full circle: The return of certificate of need regulation of health facilities to state control*. Technical report, Western Consortium for the Health Professionals, Inc., San Francisco.
- Smith, K. G., & Grimm, C. M. 1987. Environmental variation, strategic change and firm performance: A study of railroad deregulation. *Strategic Management Journal*, 8: 363–376.

- Starkweather, D. B., & Carman, J. M. 1988. The limits of power in hospital markets. *Medical Care Review*, 45: 5-48.
- Staw, B. M. 1980. The consequences of turnover. *Journal of Occupational Behavior*, 1: 253-273.
- Staw, B. M., Sandelands, L. E., & Dutton, J. E. 1981. Threat rigidity effects in organizational behavior: A multilevel analysis. *Administrative Science Quarterly*, 26: 501-524.
- Tushman, M. L., & Anderson, P. 1986. Technological discontinuities and organizational environments. *Administrative Science Quarterly*, 31: 439-465.
- Tushman, M. L., & Keck, S. 1989. *Environmental and organization context and executive team characteristics: An organization learning approach*. Working paper, Graduate School of Business, Columbia University, New York.
- Tushman, M. L., & Romanelli, E. 1985. Organizational evolution: A metamorphosis model of convergence and reorientation. In L. L. Cummings & B. M. Staw (Eds.), *Research in organizational behavior*, vol. 7: 171-222. Greenwich, CT: JAI Press.
- Tushman, M. L., Virany, B., & Romanelli, E. 1989. *A longitudinal study on the determinants of executive succession*. Working paper, Graduate School of Business, Columbia University, New York.
- Wagner, W. G., Pfeffer, J., & O'Reilly, C. A., III. 1984. Organizational demography and turnover in top-management groups. *Administrative Science Quarterly*, 29: 74-92.
- Walsh, J. P. 1988. Top management turnover following mergers and acquisitions. *Strategic Management Journal*, 9: 173-184.
- Warner, K. 1978. Effects of hospital cost containment on the development and use of medical technology. *Millbank Memorial Fund Quarterly*, 56: 187-211.
- Williamson, O. E. 1964. *The economics of discretionary behavior: Managerial objectives in a theory of the firm*. Englewood Cliffs, NJ: Prentice-Hall.
- Williamson, O. E. 1975. *Markets and hierarchies: Analysis and antitrust implications*. New York: Free Press.
- Williamson, O. E. 1985. *The economic institutions of capitalism: Firms, markets, and relational contracting*. New York: Macmillan.
- Zald, M. N. 1969. The power and function of boards of directors: A theoretical synthesis. *American Journal of Sociology*, 75: 97-111.
- Zald, M. N. 1970. Political economy: A framework for analysis. In M. N. Zald (Ed.), *Power in organizations*: 221-262. Nashville: Vanderbilt University Press.

Jerry Goodstein earned his Ph.D. degree at the University of California, Berkeley. He is an assistant professor of management at Washington State University, Vancouver. He is currently examining the relationship between the demography of governance structures and organizational/strategic change.

Warren Boeker earned his Ph.D. degree at the University of California, Berkeley. He is an assistant professor of management at the Graduate School of Business, Columbia University. His current research interests include strategic management, organization theory, entrepreneurship, and organizational ecology.

RELATIONSHIP OF CAREER MENTORING AND SOCIOECONOMIC ORIGIN TO MANAGERS' AND PROFESSIONALS' EARLY CAREER PROGRESS

WILLIAM WHITELY

University of Oklahoma

THOMAS W. DOUGHERTY

University of Missouri-Columbia

GEORGE F. DRÉHER

Indiana University

This study examined the relationship of career mentoring to the promotions and compensation received by 404 early career managers and professionals working in a variety of organizations. The results indicate that with a number of variables controlled, career mentoring was related to both promotion rate and total compensation. The results also support the conclusion that career-oriented mentoring has a greater relationship with promotion rate for people from the highest-level socioeconomic backgrounds than for those from lower-level backgrounds. We provide several explanations for the effects of career mentoring on early career progress and suggest a number of areas for future research on mentoring and other developmental relationships.

Studies of the early career progress of managers and professionals have frequently been based on the principle that ability, achievement, and contributions to an employing organization determine career progress (e.g., Campbell, Dunnette, Lawler, & Weick, 1970: 25-40; Howard & Bray, 1988: 54-80). However, researchers also have recognized that organizations often allocate managers' and professionals' career promotions and financial rewards on the basis of informal interpersonal processes and ascriptive criteria (Coates & Pellegrin, 1957; Pfeffer, 1977b). This article presents findings from a study examining mentoring and socioeconomic origin as determinants of early career outcomes for managers and professionals who were graduates of three colleges of business. Our purpose is to draw attention to the fact that measures of early career progress, such as income and rate of advancement,

This study was supported by a summer research grant from the College of Business, University of Oklahoma. The analysis and writing were completed while the first author was on sabbatical at the Laboratory for Applied Psychology, State University of Gent, Belgium. We extend our thanks to Pol Coetsier and Rita Spoelders-Class for their support and to Elaine Davis for her assistance. We also received financial support from the Ponder Faculty Development and Research Fund, College of Business and Public Administration, University of Missouri-Columbia. The ideas and opinions expressed herein are solely those of the authors.

are also related to both interpersonal processes such as mentoring and ascriptive criteria such as socioeconomic origin. An examination of these relationships provides insight into the process by which employers single out people in the early parts of their careers for rewards.

With the exception of single-organization studies of early managerial potential (e.g., Howard & Bray, 1988), previous studies of the early career period have provided few findings on career processes (Dreher, Dougherty, & Whitely, 1985; Harrell, 1969; Pfeffer, 1977a,b; Sheridan, Slocum, Buda, & Thompson, 1990; Weinstein & Srinivasan, 1974). Three particular areas stand out as requiring additional investigation. First, research has typically used salary as the measure of early career progress. Researchers know little about other measures of career outcomes, such as rates of advancement, and the effects of career influences on these outcomes. Investigation of additional measures of early career outcomes is important in order to develop a general understanding of this period in the work life of professionals and managers. The range of dependent variables studies should grow to include additional career processes, especially since the determinants of career processes may differ. We included in our study both a measure of income and a measure of rate of promotion as criteria of early career progress.

Second, additional influences on early career outcomes need investigation. One widely recognized interpersonal influence process is mentoring. Although mentoring has been recognized as a means for fostering career development and progress, it remains an informal practice in most organizations and has not received much systematic research attention (Kram, 1985). A second social influence on career progress, widely investigated in sociology, is social stratification, particularly socioeconomic status. Research in sociology has generally confirmed the important influence of socioeconomic origin on education and occupational attainment (Blau & Duncan, 1967; Sewell, 1971). However, only Pfeffer (1977a) and Dreher and colleagues (1985) systematically examined the joint role of attainments—like the level of education achieved—and ascribed influences—like socioeconomic status—in shaping career progress.

Finally, research should examine moderators of career progress variables and their determinants. Ascriptive characteristics of managers and professionals, particularly socioeconomic origin, have been found to interact with other determinants of career progress (Pfeffer, 1977a; Dreher et al., 1985). Failure to consider the interaction of variables such as class background and other career influences diverts attention from the career processes actually operating in organizations. In the present study, we examined socioeconomic origin as a moderator of the relationship of mentoring to measures of early career progress.

THEORY AND HYPOTHESES

Career Mentoring as an Influence on Career Progress

Mentoring is a particular interpersonal relationship that can influence career progress. There are two distinct conceptions of the mentoring con-

struct. Classical, or primary, mentoring is an intense developmental relationship of relatively long duration in which protégés receive a range of career and psychosocial help exclusively from one senior manager (Clawson, 1980; Kram, 1985; Levinson, Darrow, Klein, Levinson, & McKee, 1978). Secondary mentoring is a shorter, less intense, less inclusive developmental process involving multiple relationships, each offering specialized developmental functions (Phillips-Jones, 1982; Zey, 1984). Thomas (1986) delineated a continuum of developmental relationships varying as to duration of contact, degree of mutuality, and relationship functions served. Secondary mentoring tends to focus on external, career progress-oriented functions, such as sponsorship and visibility and exposure, rather than on inner-oriented psychosocial developmental functions (Kram, 1985).

In this study, we focused on secondary mentoring. Such career-oriented mentoring may come from protégés' immediate bosses, managers in other units, and other senior managers. There were three reasons for our focus. First, secondary mentoring is probably easier for young employees to come by than classical, primary mentoring, given the recent pace of organizational change and individual career transitions (Kram, 1986). Indeed, Kram (1985) found that classical mentoring had a very low base rate even in organizations with very stable, well-structured internal labor markets. Second, given their high career mobility, independence, and particular needs, people in the early career stage are more likely to have several developmental relationships than just one (Kram, 1986; Phillips-Jones, 1982). Third, labor-market supply and demand characteristics, such as the unstable growth and decline of adjacent age cohorts, international competition, rapid technological change, and organizational downsizing combine to push mentoring more toward secondary developmental relationships (Ahlburg & Kimmel, 1986; Stewman & Konda, 1983). Yet, as Berlew and Hall (1966) noted, early career developmental activities can have long-term effects on the career progress of managers and professionals.

Kram (1985) described mentoring as a set of roles and role activities including coaching, support, and sponsorship. As coaches or teachers, mentors seek to develop many interpersonal and intellectual skills in their protégés. As counselors, mentors provide socioemotional support and seek to bolster the self-confidence and self-esteem of protégés. Finally, as sponsors, mentors actively intervene, contriving to get their protégés exposure and visibility through assignments that involve working with other managers and endorsing their protégés for promotions and special projects. Kram (1985) established two broad categories encompassing these functions, with psychosocial mentoring referring to activities like providing counseling and friendship and career mentoring referring to providing sponsorship, exposure, and the like.

Past mentoring research has had two major limitations. First, not enough attention has been directed to the effects of mentoring on early career outcomes; the process of mentoring has mainly been the focus. Although previous studies have suggested important linkages with career outcomes,

there is a great need for more systematic analyses of mentoring-outcome relationships. Second, past research has typically studied middle-level to senior managers but often made recommendations on the importance of mentoring for managers or professionals at the beginning of their careers (Roche, 1979; Zey, 1984).

Socioeconomic Origin as a Moderator

Although researchers have commonly viewed socioeconomic status as having a main effect on career progression, it may also operate as a moderator. Career mentoring, for example, may interact with socioeconomic background in influencing early career progress. There are several ways in which particular socioeconomic groups may profit more than other groups from various dimensions of mentoring activity.

First, mentoring might be a way to help those from less advantaged backgrounds compete successfully. If mentoring assists the less advantaged, young managers and professionals from lower-level socioeconomic origins might be expected to benefit more from mentoring activity than others. Mentoring may act as a compensatory process to provide such new workers with the role modeling, acceptance, confirmation, and counseling they did not acquire in their families or in school. Acquisition of those qualities reduces social distance and increases perceived similarity with significant others who influence career progress. From this perspective, mentoring is a kind of socialization process. The successful acquisition of skills, attitudes, and beliefs may ease protégés' passage through barriers separating them from inclusion in elite groups (VanMaanen & Schein, 1979) providing access to social networks that can further facilitate career progress.

Alternatively, those from higher social class origins may profit more from mentoring, especially career-oriented mentoring, than members of other groups. The high-level managers who act as mentors will likely come from upper-class origins themselves (Blau & Duncan, 1967; Stinchcombe, 1965), and their perceived similarity with protégés from high social classes will result in a strong bond with and commitment to these protégés. Other studies have reported that supervisor-subordinate similarity is positively related to subordinate performance in organizations (cf. Turban & Jones, 1988). A similar process may occur in career mentoring relationships.

Protégés from high social classes may also share social values, skills, and networks with senior managers, thus forging strong bonds. The business grooming protégés receive from mentors in combination with their own social skills may be particularly important in fostering career progress. It is interesting to note that Roderick and Yarney (1976) found that high socioeconomic origin was a key criterion in determining which of the 1,247 young men in their four-year study received training. Thus, a combination of social attributes and career mentoring may particularly favor such individuals in their career progress.

Career mentoring could also produce a "coattail effect" in which upper-class protégés are pulled along as their mentors rise in an organization. If the

mentors of protégés from high socioeconomic levels are powerful in their organizations, the career-enhancing effects of mentoring would be especially strong.

High social class origin may also affect the kinds of options, information, developmental experiences, and social linkages established with mentors. Upper-class protégés may receive higher-quality information, advice, and exposure than others, a direct career-enhancing benefit.

Alternative Predictors of Career Progress

Although our interest was in the joint influence of career mentoring and socioeconomic origin on early career progress, we recognized that there are many career influences and sought to include several influences other than mentoring as control variables. Research and theory in labor economics, sociology, and management has suggested several influences on measures of compensation and rate of advancement as indicators of early career progress (Pfeffer, 1977b; Stumpf & London, 1981). We organized these influences into four major categories: human capital, job-organizational, motivational, and demographic.

We included four human capital factors as control variables: (1) the degree a person attained (Bachelor of Science in Business Administration [B.S.B.A.] or M.B.A.), (2) the amount of work experience the person had before and after the degree program, (3) whether the source of the person's job was formal (e.g., through an employment agency) or informal (e.g., through a personal contact), and (4) whether or not the person's work history after attaining the terminal degree was continuous or interrupted. Total compensation and number of promotions are indicators of the value an organization places on an employee, and new employees can influence that valuation through their human capital investments.

Job and organizational characteristics can also influence early career progress. Line managers typically receive more income than staff personnel. Similarly, jobs in finance, sales and marketing, and technical fields may differ from each other and from general management jobs on these measures of early career progress. People in technical positions, for example, frequently command higher total incomes than other employees. Large organizations have a greater ability to pay and more elaborate internal labor markets with greater promotion opportunities than small organizations. Finally, in recent years the service sector of the economy has grown more rapidly than the manufacturing sector, and subsequent industry differences may affect both compensation and promotion rates.

Motivational factors can also influence early career progress. Average hours worked per week may indicate work involvement and the drive to excel in order to obtain early career rewards. Expected future income is an aspirational measure that can increase a person's work motivation. It may also tap aspects of ability to attain high-level positions. Finally, we included a measure of work centrality that taps the importance people attach to work as compared to other life interests. A recent international comparative study

extensively investigated work centrality and found it to be particularly high among managers and professionals (Meaning of Working International Research Team, 1987).

Variables also included demographic measures. Gender differences have typically been found in measures of compensation. Marital status may also relate to career progress. Married workers may, for example have more stable lives than unmarried people, which allows the former to concentrate on their careers. Alternatively, being married may represent a competing claim on time and effort that may particularly affect compensation and promotion.

In summary, the purpose of the present study was to test the following two hypotheses in a group of managers and professionals in the early parts of their careers.

Hypothesis 1: With other variables controlled, mentoring is related to measures of the early career progress of managers and professionals.

Hypothesis 2: With other variables controlled, socioeconomic status moderates the relationship of mentoring with the career progress of early career managers and professionals. That is, the relationship between mentoring and career progress will be different for those from upper- and lower-level socioeconomic backgrounds.

METHODS

Data and Setting

Using alumni records at the Universities of Kansas, Missouri, and Oklahoma, we surveyed all graduates of the M.B.A. programs from the classes of 1980, 1981, and 1982. Individuals graduating from undergraduate business programs at those universities in the same years were randomly sampled so that the numbers of M.B.A. and B.S.B.A. degree holders were equivalent. Potential respondents received questionnaires and stamped return envelopes. To encourage responses, we promised them feedback on some basic results, including salary information. In addition, several weeks after the initial mailing we sent a follow-up letter to all questionnaire recipients urging them to complete their surveys and mail them in. A total of 633 questionnaires were returned, representing a response rate of 52 percent. Although no precise analyses contrasting respondents and non-respondents were possible, the response rates were essentially the same across universities and degree groups. The data were collected during the late fall and early winter of 1985–86.

The group for analysis consisted of individuals who were employed full-time at the time of data collection. We eliminated those who had pursued additional degrees, were self-employed, or were employed in family-owned businesses because of the effects those career directions might have

on mentoring activity and the criterion measures. Finally, we eliminated the few people who were not currently employed or who were working fewer than 35 hours per week at the time of the survey. The members of the analysis group averaged 30 years of age, and 28 percent were women. All analyses were performed on 404 individuals for whom data on all variables were complete.

Criteria

Number of promotions. We measured the total number of promotions each respondent had received since graduation, in effect an index of rate of advancement because we used the number of years since graduation as a control variable. We defined promotions for the respondents as involving more than one of the following: significant increases in scope of responsibilities, significant increases in annual salary, changes in level in the employing company, changes in offices or office decor, and becoming eligible for bonuses, incentives, or stock plans. All respondents were asked to record the number of promotions received in their careers to date. The more quickly employees achieve authority, responsibility, and decision influence, the higher will be their promotion rate relative to others.

Our measure of promotions represents a departure from previous measures of this construct, such as Bass and Burger's (1979), in several ways. We used number of promotions rather than the ratio of the number of organizational levels below a respondent to the total number of organizational levels because we thought respondents would not know total numbers of organizational levels. Further, research indicates that numbers of hierarchical levels differ between functional departments (Evans, 1975). Second, we did not use age as a denominator because doing so would have resulted in deceptively low advancement rates for those who received their degrees when older, while younger respondents would have deceptively high rates. As mentioned previously, we used "years since graduation" as a control variable in the analyses. Finally, Bass and Burger (1979) used organization size as part of their index of rate of advancement, a reasonable procedure given that their measurement was structural, or based on organizational characteristics. But our study included organization size as a statistical control. Following one or the other procedure is necessary when a sample includes respondents from different-sized organizations.

Current total compensation. This variable measured financial compensation from an employer in all forms, including direct pay, bonuses, commissions, company stock options, profit sharing, and other financial compensation. We requested information on each source in dollar amounts and summed the separate figures to arrive at current total compensation.

Predictors

Socioeconomic status. Respondents self-rated their families' social class using the following categories: (1) The underclass was defined as families depending primarily on the welfare system, having living standards below

the poverty line and family members with no regular employment and a low level of schooling. (2) The working poor were defined as families with living standards below mainstream level but above the poverty line; family members might be low-paid service workers or operatives, with some high school. (3) Working-class families had members with mid-level blue-collar or lower-level white-collar jobs and incomes slightly above the national average. (4) Mid-level white-collar or top-level blue-collar jobs, education past high school, and incomes somewhat above the national average were attributes of middle-class status. (5) Upper-level managers, professionals, and owners of medium-sized businesses with college educations and incomes nearly twice the national average composed the upper-middle class. (6) Members of the social elite, with incomes primarily from earned or inherited assets, were considered upper class. We constructed two dummy variables for the analyses since the questionnaire measure on socioeconomic background had an ordinal scale. In constructing the dummy variables, we took into account the distribution of respondents across the socioeconomic status categories. Thus, the first variable included the upper- and upper-middle-class groups ($N = 138$), and the second included the middle-class group ($N = 172$), with the working class, working poor, and underclass combined coded as the contrast group ($N = 94$).

Career mentoring practices. Respondents indicated the extent to which they had experienced the particular activities described in the ten statements listed in the Appendix. A five-point scale was used for responses. We drew the statements primarily from Kram's (1985) illustrations of coaching, exposure and visibility, protection, personal support, and sponsorship practices, abridging or modifying those illustrations for the questionnaire. The questions focused on immediate superiors, higher-level managers, or managers in units other than a respondent's who provided mentoring activities and on career mentoring respondents had received over their entire career spans; thus, the measure likely tapped significant secondary (vs. primary) mentoring. We constructed a mentoring scale by summing the unweighted item ratings to obtain a score ($\alpha = .83$).

Controls

Several of the control variables used in this study are the same as those Pfeffer (1977a,b) and Dreher and colleagues (1985) used. To assess human capital investment, we coded degree as 1 for a B.S.B.A. and 2 for an M.B.A. Work experience was the number of years a respondent had worked full-time both before and after graduation from the terminal degree program. Job source was determined by having respondents check the source used to obtain their current jobs. The sources, taken from Granovetter (1974), included printed advertisements, state placement services, employment agencies, and direct applications as formal. Informal sources included asking a friend or co-worker, being contacted by a friend or co-worker who knew of a respondent's job search, being contacted by a friend or co-worker who did not know of the job search, hearing about a job from a family member, and being

contacted by someone the respondent did not know to whom the respondent had been recommended. Formal sources were coded with 1 and informal sources with 2. *Continuous work history* was coded 1 if respondents had worked continuously since taking their terminal degrees and 2 if there had been any work interruptions since then.

The job and organization control variables were measured as follows: *Staff positions* were coded 1 and line positions 2. Four dummy variables were constructed to measure the *functional area* of a respondent's current position. Jobs in financial, sales and marketing, technical, and other professional areas (for instance, personnel or public affairs) were each contrasted with jobs in general management. *Organization size* was coded into eight categories ranging from 1–50 employees to 50,000 or more employees. Two dummy variables were constructed for *industry*. The first represented manufacturing and the second financial and accounting services, with other services as the contrast group. We used these categories because Pfeffer (1977b) suggested that career processes may differ for people in financial services and those in manufacturing and other industries.

The three motivational control variables were measured as follows: *Average hours worked* per week was an estimate provided by respondents. *Expected future income* was their estimate of their percentage increases in earnings ten years from the date of questionnaire completion with inflation not taken into account. The response alternatives ranged from 1, about the same salary as present, to 5, about three times as much as now. *Work centrality* was measured with a single, forced-choice question in which respondents divided 100 points between five different facets of life: leisure, community, work, religion, and family (Meaning of Working International Research Team, 1987). We included the total number of points assigned to work in the analyses.

The demographic characteristics included as control variables were measured as follows: *gender* was coded 1 for men and 2 for women; *marital status* was 1 for married and 2 for single, divorced, or widowed; *university* was controlled by constructing dummy variables for the Universities of Oklahoma and Kansas, both contrasted with the University of Missouri; and *years since graduation* was included for each respondent.

Analyses

In performing moderated regression analyses to explain career success, we followed the procedure recommended by Zedeck (1971). Number of promotions was regressed first on the control variables, the socioeconomic origin variables, and mentoring. Next, we computed a model including the two cross-products of the socioeconomic origin variables and mentoring in addition to all other variables. The same moderated regression procedure was followed when total compensation was the dependent variable. When the set of interaction terms made a unique contribution to the regression equation, we estimated the corresponding equations for two subgroups, low and high socioeconomic origin.

TABLE 1
Means and Standard Deviations for All Respondents and Subgroups^a

Variables	All Respondents		Low Socioeconomic Status		High Socioeconomic Status	
	Means	s.d.	Means	s.d.	Means	s.d.
Degree	1.56	0.50	1.56	0.50	1.57	0.50
Work experience	7.05	5.17	7.83	5.83	5.53	3.05
Job source	1.50	0.50	1.52	0.50	1.48	0.50
Continuous work history	1.25	0.43	1.26	0.44	1.24	0.43
Line or staff?	1.60	0.49	1.60	0.49	1.60	0.49
Financial position	1.19	0.39	1.17	0.38	1.22	0.42
Sales or marketing position	1.12	0.32	1.13	0.34	1.09	0.29
Technical position	1.08	0.28	1.09	0.29	1.07	0.28
Other professional position	1.18	0.39	1.19	0.39	1.17	0.38
Organization size	5.18	2.30	5.20	2.31	5.12	2.28
Manufacturing	1.30	0.46	1.31	0.46	1.29	0.46
Financial and accounting services	1.27	0.45	1.20	0.40	1.41	0.49
Average hours worked weekly	49.22	7.63	49.44	7.92	48.80	7.05
Expected future income	3.73	0.96	3.64	0.97	3.90	0.92
Work centrality	32.23	14.21	32.91	14.78	30.91	12.98
Gender	1.28	0.45	1.27	0.45	1.29	0.46
Marital status	1.34	0.49	1.31	0.48	1.40	0.49
University of Oklahoma	1.27	0.44	1.29	0.45	1.23	0.42
University of Kansas	1.36	0.48	1.39	0.49	1.30	0.46
Years since graduation	4.00	0.90	4.00	0.87	4.00	0.97
Mentoring received	27.03	7.57	26.31	7.53	28.44	7.47
Number of promotions	2.77	1.81	2.72	1.78	2.86	1.89
Current total compensation	37,178	15,020	37,499	16,521	36,558	11,624

^a Total N = 404; low-status N = 286; high-status N = 138.

RESULTS

Table 1 shows the means and standard deviations for all variables, and Table 2 gives zero-order correlations among the variables. These zero-order correlations indicate that the socioeconomic variables were essentially unrelated to mentoring and the two career progress variables. Mentoring was related to having a continuous work history, being in a managerial rather than a sales, marketing, or technical position, a high number of hours worked per week, high expected future income, high work centrality, and membership in the upper or upper-middle class. However, only the correlation with hours worked was greater than .14.

Hypothesis 1: Mentoring and Career Progress

Results indicate that with other variables controlled, mentoring was related to both promotion rate and total compensation, thus supporting the first hypothesis. Table 3 displays these results for both outcome variables under "all respondents," columns 1 and 4. The standardized regression coefficient for mentoring and promotion rate was .19 ($p < .01$), and for mentoring and total compensation it was .13 ($p < .01$).

The results displayed in Table 3 also indicate that for all respondents, variables significantly related to promotion rate included work experience and continuous work history in addition to mentoring. Variables other than mentoring significantly related to compensation included having an M.B.A. degree, lengthy work experience, a continuous work history, a managerial position (versus both financial and other professional jobs), employment in a manufacturing industry, a high number of hours worked, high expected future income, male gender, a University of Missouri (vs. Kansas) degree, and a high number of years since graduation.

Hypothesis 2: Moderating Effects of Socioeconomic Status

The second hypothesis predicted that socioeconomic origin would moderate the relationship of career mentoring with promotion rates and compensation. Table 4 shows results of the moderated regression analysis for promotion rate, which support an interaction hypothesis. The set of terms crossing career mentoring and socioeconomic origin made a unique contribution to the regression of promotions on the predictors ($\Delta R^2 = .023$; $F_{2,378} = 5.23$, $p < .01$). Because of the significance of the interaction terms, we estimated separate equations for two socioeconomic subgroups. This procedure provided for the appropriate estimation of the effect of mentoring practices on promotions because the magnitude of the effect varied between socioeconomic subgroups.

The regression analysis results for two socioeconomic subgroups appear in Table 3, columns 2 and 3. In this analysis, the high socioeconomic group represents those reporting upper-middle and upper-class backgrounds, and the low group includes those from the remaining four social class backgrounds. This breakdown represents a clear conceptual distinction between

TABLE 2 (continued)

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
13. Average hours worked weekly	.20	.12	.01	-.18	.08	-.06	-.06	-.10	-.06	.01	-.08	-.01												
14. Expected future income	-.09	-.22	.07	.00	.08	.04	.00	-.15	-.07	-.12	-.03	.16	.14											
15. Work centrality	.16	-.02	.00	-.08	-.03	-.03	-.09	-.01	.01	.02	-.04	.06	.30	.02										
16. Gender	-.07	-.14	.06	.06	-.07	.10	-.02	-.05	.02	-.04	-.10	.13	-.10	-.18	.02									
17. Marital status	-.10	-.18	.02	.12	-.04	.09	-.05	-.03	.04	.06	-.03	.12	-.03	.05	.37	.04								
18. University of Oklahoma	.06	.28	.05	-.11	.04	-.08	.02	.08	-.07	.00	.03	-.05	-.03	-.16	-.01	-.06	-.08							
19. University of Kansas	-.02	-.21	.03	.12	-.05	-.08	-.07	-.15	.06	-.04	.05	-.04	.02	.05	-.02	.02	.04	-.45						
20. Years since graduation	.05	.13	.01	-.06	.00	-.02	-.08	-.03	.02	-.04	.04	-.05	.05	-.22	.00	.00	-.08	-.05	.03					
21. Upper or upper-middle class	.00	-.21	-.04	-.02	.00	.07	-.05	-.03	-.02	-.02	-.02	.22	-.04	.13	-.07	.02	.08	-.06	-.09	.00				
22. Middle class	.01	.02	.00	.02	.01	.00	.01	-.01	.01	-.10	-.01	-.09	.00	-.01	.15	.06	-.01	-.02	.02	.01	-.62			
23. Mentoring received	.05	-.08	.07	-.10	-.04	-.02	-.10	-.11	-.07	.07	.02	.02	.20	.10	.14	-.02	.02	-.02	.05	.07	.13	-.06		
24. Number of promotions	.09	.20	.05	.18	.05	-.04	-.11	-.03	-.02	.03	-.01	-.01	.16	.01	.13	-.09	.03	.00	-.03	.12	.04	-.02	.23	
25. Current total compensation	.40	.29	.03	-.29	.08	-.17	-.09	.04	-.14	.11	.06	-.07	.35	.09	.12	-.22	-.16	.07	-.10	.17	-.03	-.04	.22	.33

* N = 404. Correlations $\geq .10$ are significant at the .05 level; those $\geq .12$ are significant at the .01 level.

TABLE 3
Predictors of Number of Promotions and Total Compensation for All
Respondents and Socioeconomic Subgroups^a

Predictors	Number of Promotions			Total Compensation, All Respondents
	All Respondents	Low Socioeconomic Status	High Socioeconomic Status	
Human capital variables				
Degree	-.03	.02	-.21*	.25**
Work experience	.22**	.15*	.31	.14**
Job source	.03	.08	.00	.03
Continuous work history	-.11*	-.16**	.01	-.15**
Job and organization variables				
Line or staff?	.06	.05	.14	.06
Financial position	-.03	-.03	.02	-.14**
Sales or marketing position	-.07	-.09	-.09	-.07
Technical position	-.04	-.10	.02	-.05
Other professional position	-.03	-.09	.07	-.14**
Organization size	-.01	-.06	.12	.03
Manufacturing	.02	.02	.00	.09*
Financial and accounting services	-.01	.07	-.09	.04
Motivational variables				
Average hours worked weekly	.06	.09	.00	.17**
Expected future income	-.01	-.03	.02	.09*
Work centrality	.07	.00	.16	.03
Demographic variables				
Gender	-.05	-.08	.02	-.11**
Marital status	.05	.01	.19*	-.08
University of Oklahoma	-.07	-.07	-.05	-.06
University of Kansas	-.02	-.05	.01	-.11*
Years since graduation	.06	-.05	.22**	.11**
Upper or upper-middle class	.07			-.08
Middle class	.02			-.08
Mentoring received	.19**	.08	.42**	.13**
R	.396**	.397**	.633**	.643**
Adjusted R ²	.108	.086	.293	.377
N	404	266	138	404

^a The regression coefficients shown are standardized.

* $p < .05$

** $p < .01$

those from privileged and managerial family backgrounds and those from less privileged backgrounds. These results indicate that career mentoring activity did not predict early career promotions for employees from lower-class backgrounds. Rather, two control variables, years of work experience

TABLE 4
Results of Moderated Regression Analysis for the Interaction of
Socioeconomic Origin and Career Mentoring^a

Outcome Variables	Model 1	Model 2	Increment to R^2	Incremental F
Number of promotions	.157	.180	.023	5.23*
Total compensation	.413	.413	.000	

^a $N = 404$. Model 1 included mentoring, the control variables, and socioeconomic origin; model 2 also included mentoring by socioeconomic origin.

* $p < .01$

and continuous work history, were related to the promotions of those employees.

Career mentoring activity did predict number of promotions for employees from upper-class backgrounds. Additionally, respondents who had B.S.B.A. degrees received more promotions than those with M.B.A. degrees; single respondents had more promotions than those who were married; and promotions increased with years since graduation. In general, the results indicate that the equations were much more predictive of promotions among upper-class respondents than among lower-class respondents. The adjusted R^2 is .293 for those from upper-class origins and .086 for those from lower-class origins.

There could be artifacts in the data that would account for the differential relationship of career mentoring to number of promotions for the two socioeconomic subgroups. For example, people in the two subgroups may perceive the amount of mentoring activity received differently. If that were the case, there should be differences in the homogeneity of variance between the two subgroups on the mentoring scale. However, results of a Bartlett test (McNemar, 1969) showed no such difference ($p = 0.49$). There could also be mean differences in responses to the career mentoring scales for the two socioeconomic subgroups. These differences would affect the intercepts of the two regression lines but not the relationship between mentoring and promotions. A t -test did reveal a significant difference between the two subgroups on the career mentoring scale. However, the difference in the means only amounts to about one-quarter of a standard deviation, suggesting no practical difference in the responses of the two socioeconomic subgroups on the career mentoring scale.

Taken together, these findings suggest no material differences in the amounts of career mentoring activity received by respondents in the two socioeconomic subgroups. Therefore, in interpreting the observed differential relationship between career mentoring and promotions, we gave greater attention to conceptual and theoretical considerations.

Results of the moderated regression analysis for total compensation (see Table 4) do not indicate that the interaction of socioeconomic status and career mentoring is significant ($\Delta R^2 = .000$).

DISCUSSION

Little research has directly addressed the question of the extent to which career mentoring actually contributes to early career progress. In addition, prior studies of mentoring have failed to assess the extent to which ascribed attributes of individuals, such as socioeconomic origin, interact with typically informal developmental processes like mentoring. The major contributions of our study are the findings indicating that there are relationships between career mentoring and career progress and that these relationships vary according to the socioeconomic origins of young managers and professionals. However, the two socioeconomic groups in this study did not differ in their perceptions of the amount of career mentoring they had received.

In the introduction, we explained why we expected to find a differential relationship between career mentoring and early career success for people from high and low socioeconomic origins. Compared to individuals from lower-class backgrounds, individuals from higher socioeconomic origins may have mentors from higher levels, who presumably have more influence and membership in more influential networks than those from lower levels. The similarity of mentor and protégé could strengthen the bond and commitment between the two. Further, protégés from higher social origins are more likely to share social values, skills, and networks with senior managers.

Future mentoring studies should investigate quality differences in career mentoring by gathering information about the frequency of mentor-protégé interaction, similarities between mentors and protégés on several dimensions, and the relative frequency with which protégés from high and low socioeconomic origins receive grooming for career progress. Turban and Jones (1988) found that demographic similarity in supervisor-subordinate dyads increased ratings of subordinate performance. Those authors supported the view that similarity leads to a positive working relationship. Other studies have found that the quality and frequency of supervisor-subordinate interactions have an influence on subordinate performance (cf. Liden & Graen, 1980). Future research could apply this focus in the context of mentoring to identify more precisely components of the process that leads to career success.

It is possible, of course, that the causality in relationships between career mentoring and career success runs in the opposite direction: success may increase career mentoring or lead to mentoring by more influential superiors. Senior managers in organizations may watch young managers' advancement and choose to mentor those who appear to be comers. Perhaps young managers and professionals from higher social class origins are more skilled at survival, upward-maneuvering, and adaptation than those from lower social origins.¹ It is clear that the defining direction of the relationship

¹ Our thanks to G. William England for this explanation of the findings and for pointing out again the ambiguities inherent in correlational research.

between career mentoring and career progress—or identifying the possible reciprocal causal relationships involved—must wait for studies that use longitudinal research designs.

Our measure of mentoring emphasized career functions rather than psychosocial functions. It could be argued that protégés from lower socioeconomic backgrounds received less psychosocial mentoring (e.g., counseling) than those from upper-class backgrounds and that this represents a relevant but unmeasured construct in the research. However, Kram (1985) pointed out that career and psychosocial functions are not entirely distinct. We focused on career functions because our major purpose was to examine the effects of mentoring on concrete career success outcomes such as promotion rates and compensation levels. By emphasizing career functions, we measured a significant amount of secondary mentoring, which is typically easier to come by than primary mentoring and is often provided by multiple mentors over a career span (Kram, 1985; Phillips-Jones, 1982).

The present results indicate that the career progress of young managers from high socioeconomic origins may benefit more from career mentoring than that of managers from lower origins. As discussed earlier, psychosocial mentoring might benefit the early career progress of people from lower socioeconomic groups. A recent study by Dreher and Ash (1990) sheds some light on this issue. Using a global mentoring scale fully tapping both career and psychosocial mentoring, they observed no effects on outcomes for the interaction of mentoring and socioeconomic origin. Such a pattern would be expected if interactions for upper- and lower-class respondents canceled each other out.

Mentoring may also be less effective in cross-gender and cross-race situations. Clawson and Kram (1984) suggested that a variety of problems can arise in cross-gender mentoring, such as marital disruption, sexual attraction, and gossip, that can damage the effectiveness of the relationship. Kram (1985) further delineated these problems. Thomas and Alderfer (1989), summarizing research on minority career experiences, reported that race has major influences on the dynamics of mentoring. For example, although blacks do find mentors, they tend to receive more psychosocial support from same-race mentors than from others but similar levels of career support from same-race and cross-race mentors. Our study did not allow for analyses of cross-gender or cross-race mentoring, issues that certainly deserve research attention. Similarly, recent research points to the role of peers and even subordinates in providing mentoring functions (cf. Kram & Isabella, 1985). Inclusion of these relationships may have resulted in explanation of more variance in career outcomes in our study.

We should also consider other factors, such as developmental stages and the self-esteem of the mentor, that could make a difference in the outcomes of mentoring (cf. Kram, 1985). In our study, no information was available about the respondents' mentors.

The present findings should be considered in terms of their generalizability. The universities included in this study are located in adjoining states

and share many student and program characteristics. In addition, there are many similarities in the kinds of companies and industries in which the graduates of these three programs find employment. These results may not generalize to business programs with different orientations, student profiles, or locations in areas with different mixes of companies and industries. Our data also do not reflect as much variability in socioeconomic background as have some economic studies of large populations. In light of the overall nonsignificant relationship of socioeconomic origin to income, this lack of variability represents a limitation to the generalizability of our results.

In this study's high-socioeconomic-status group, people holding B.S.B.A. degrees had a higher promotion rate than those with M.B.A. degrees. This is not an altogether surprising finding, given the likelihood of there being fewer attractive initial job opportunities for bachelor's graduates than for M.B.A. graduates and the former's resulting efforts to seek better opportunities. They may also not be as careful or thorough in their initial job searches as M.B.A. graduates.

We should also point out that respondents self-reported their incomes and promotions. Unfortunately, there was no way to verify the information and investigate the possibility that these data were inflated. In addition, we originally viewed "expected future income," one of our control variables, as primarily a measure of motivation. However, given the significance of this variable in the explanation of compensation, we recognize the possibility that it captures components of the respondents' abilities, in addition to motivation.

Although this study had some methodological limitations, its results underscore the importance of studying the determinants of early career progress within the larger framework of work on social stratification, status attainment, and social influence (e.g., Sewell, Haller, & Ohlendorf, 1970; Stinchcombe, 1965). Mentoring practices may be a form of socialization in business organizations that is particularly sensitive to early family socialization. As such, mentoring processes may be closely related to early developmental experiences in people's lives (Super, 1980).

REFERENCES

- Ahlburg, D. A., & Kimmel, L. 1986. Human resources management implications of the changing age structure in the U.S. labor force. In J. M. Rowland & G. R. Ferris (Eds.), *Research in personnel and human resources management*: 339-374. Greenwich, CT: JAI Press.
- Bass, B., & Burger, P., in collaboration with R. Doktor & G. Barrett. 1979. *Assessment of managers: An international comparison*. New York: Free Press.
- Berlew, D., & Hall, D. 1966. The socialization of managers: Effects of expectations on performance. *Administrative Science Quarterly*, 21: 207-223.
- Blau, P., & Duncan, O. 1967. *The American occupational structure*. New York: Wiley.
- Campbell, J. P., Dunnette, M. D., Lawler, E. E., & Weick, K. E. 1970. *Managerial behavior, performance, and effectiveness*. New York: McGraw-Hill Book Co.
- Clawson, J. 1980. Mentoring in managerial careers. In C. B. Derr (Ed.), *Work, family and the career*: 144-165. New York: Praeger.
-

- Clawson, J., & Kram, K. 1984. Managing cross-gender mentoring. *Business Horizons*, 27(3): 22–32.
- Coates, C., & Pellegrin, R. 1957. Executives and supervisors: Informal factors in differential bureaucratic promotion. *Administrative Science Quarterly*, 2: 200–215.
- Dreher, G. F., & Ash, R. A. 1990. A comparative study of mentoring among men and women in managerial, professional, and technological positions. *Journal of Applied Psychology*, 75: 539–546.
- Dreher, G. F., Dougherty, T. W., & Whitely, B. 1985. Generalizability of MBA degree and socioeconomic effects on business school graduates' salaries. *Journal of Applied Psychology*, 70: 769–773.
- Evans, P. 1975. Multiple hierarchies and organization control. *Administrative Science Quarterly*, 20: 250–259.
- Granovetter, M. S. 1974. *Getting a job*. Cambridge, MA: Harvard University Press.
- Harrell, T. 1969. The personality of high earning MBA's in big business. *Personnel Psychology*, 22: 457–463.
- Howard, A., & Bray, D. W. 1988. *Managerial lives in transition: Advancing age and changing times*. New York: Guilford Press.
- Kram, K. E. 1985. *Mentoring at work: Developmental relationships in organizational life*. Glenview, IL: Scott, Foresman.
- Kram, K. E. 1986. Mentoring in the workplace. In D. T. Hall and associates (Eds.), *Career development in organizations*: 160–201. San Francisco: Jossey-Bass.
- Kram, K. E., & Isabella, L. 1985. Mentoring alternatives: The role of peer relationships in career development. *Academy of Management Journal*, 28: 110–132.
- Levinson, D. J., Darrow, C. N., Klein, E. B., Levinson, M. A., & McKee, B. 1978. *Seasons of a man's life*. New York: Knopf.
- Liden, R., & Graen, G. 1980. Generalizability of the vertical dyad linkage model of leadership. *Academy of Management Journal*, 23: 451–465.
- McNemar, Q. 1969. *Psychological statistics*. New York: John Wiley & Sons.
- Meaning of Working International Research Team. 1987. *The meaning of working*. London: Academic Press.
- Pfeffer, J. 1977a. Effects of an MBA and socioeconomic origin on business school graduates' salaries. *Journal of Applied Psychology*, 62: 698–705.
- Pfeffer, J. 1977b. Toward an examination of stratification in organizations. *Administrative Science Quarterly*, 22: 553–567.
- Phillips-Jones, L. 1982. *Mentors & protégés*. New York: Arbor House.
- Roche, G. 1979. Much ado about mentors. *Harvard Business Review*, 57(1): 14–28.
- Roderick, R. A., & Yarney, J. P. 1976. Developing younger workers: A look at who gets trained. *Journal of Management*, 2: 19–26.
- Sewell, W. 1971. Inequality of opportunity for higher education. *American Sociological Review*, 36: 793–809.
- Sewell, W., Haller, A., & Ohlendorf, G. 1970. The early educational and early occupational attainment process: Replication and revisions. *American Sociological Review*, 35: 1014–1027.
- Sheridan, J. E., Slocum, J. W., Buda, R., & Thompson, R. 1990. Effects of corporate sponsorship and departmental power on career tournaments. *Academy of Management Journal*, 33: 578–602.
- Stewman, S., & Konda, S. L. 1983. Careers and organizational labor markets: Demographic models of organizational behavior. *American Journal of Sociology*, 88: 637–685.

- Stinchcombe, A. 1965. Social structure and organizations. In J. March (Ed.), *Handbook of organizations*: 142–193. Chicago: Rand McNally.
- Stumpf, S. A., & London, M. 1981. Management promotions: Individual and organizational factors influencing the decision process. *Academy of Management Review*, 6: 539–549.
- Super, D. 1980. A life-span, life-space approach to career development. *Journal of Vocational Behavior*, 16: 282–298.
- Thomas, D. A. 1986. *An intra-organizational analysis of black and white patterns of sponsorship and the dynamics of cross-racial mentoring*. Unpublished doctoral dissertation, Yale University, New Haven, CT.
- Thomas D. A., & Alderfer, C. P. 1989. The influences of race on career dynamics: Theory and research on minority career experiences. In M. D. Arthur, D. T. Hall, & B. S. Lawrence (Eds.), *Handbook of career theory*: 133–158. New York: Cambridge University Press.
- Turban, D., & Jones, A. 1988. Supervisor-subordinate similarity: Types, effects, and mechanisms. *Journal of Applied Psychology*, 73: 228–234.
- VanMaanen, J., & Schein, E. 1979. Toward a theory of organizational socialization. In B. M. Staw (Ed.), *Research of organizational behavior*, vol. 1: 209–264. Greenwich, CT: JAI Press.
- Weinstein, A., & Srinivasan, V. 1974. Predicting managerial success of master of business administration (MBA) graduates. *Journal of Applied Psychology*, 59: 207–212.
- Zedeck, S. 1971. Problems with the use of “moderator” variables. *Psychological Bulletin*, 76: 295–310.
- Zey, M. 1984. *The mentor connection*. Homewood, IL: Dow Jones-Irwin.

APPENDIX

Career Mentoring Scale

My first boss or another boss has been influential in my being able to work on assignments with other people outside of my immediate work area.

There is a manager in this organization who has had an influence on what has happened in my career. S(he) kind of looks out for where I go and what kind of assignments I get.

There is a manager in this organization I have never worked for who has given me an awful lot of confidence in myself. Because s(he) has pushed and advised me, I feel that I am growing and am a more valuable person to the company. S(he) has gotten me to do things that I have never enjoyed before (e.g., speaking before groups, speaking before superiors, running a meeting) that now don't bother me.

There is a more senior manager who I do not directly work for who has coached me, or provided me with challenging assignments, or provided me with visibility/exposure to other managers in the company or pushed and advised me on my career.

To what extent does your boss or some other superior keep you informed about what is going on at higher levels in the company or how external conditions (industry, government, etc.) are influencing the company?

To what extent has your boss or some other manager protected you from working with other managers or work units before you know their likes/dislikes, who can be trusted/not trusted, relationships between people or the politics of the company?

To what extent has your supervisor or some other manager gone out of his/her way to promote your career interests by his/her actions and decisions?

How frequently in your career has a direct superior publicly supported or actively nominated you for desirable work assignments which bring you into direct contact with higher level managers?

How frequently in your career have your direct superiors given you an assignment that required your personal contact with higher level managers?

How frequently in your career have your direct superiors given you an assignment that required your personal contact with managers in different parts of the company?

William Whitely received his Ph.D. degree in industrial relations from the University of Minnesota. He is an associate professor of human resource management at the University of Oklahoma. His current research interests focus on nonability factors in managerial-professional career success. He is also part of an international team conducting a comparative longitudinal study of the early careers of entry-level blue-collar workers in ten countries.

Thomas W. Dougherty received his Ph.D. degree in industrial-organizational psychology from the University of Houston. He is an associate professor of management at the University of Missouri. His research interests include role stress, nonability factors in managers' and professionals' career success, interviewing, and recruitment processes.

George F. Dreher received his Ph.D. degree in industrial-organizational psychology from the University of Houston. He is a professor of management at Indiana University. His research interests include staffing, compensation, and nonability factors in managers' and professionals' career success.

INTERPERSONAL RELATIONS AS A CONTEXT FOR THE EFFECTS OF APPRAISAL INTERVIEWS ON PERFORMANCE AND SATISFACTION: A LONGITUDINAL STUDY

BARRY R. NATHAN

University of Wisconsin-Madison

ALLAN M. MOHRMAN, JR.

JOHN MILLIMAN

University of Southern California

The field study reported here examined the effect of interpersonal relations between supervisors and subordinates on the content and efficacy of performance appraisal reviews. One to two months after the reviews occurred and two to four months after interpersonal relations were measured, we measured subordinates' reactions to their review, their job satisfaction, and their supervisors' evaluations of their performance. Even after statistically controlling for the favorableness of performance evaluations, we found that subordinate reactions to review were affected by interpersonal relations and by three measures of review content: the evaluation criteria used, the opportunity for subordinate participation, and the presence of career discussion. The three content variables also had effects on subordinate performance and satisfaction.

Few topics in personnel research have received as much attention as performance appraisal. Accurate feedback about performance is regarded as critical to an employee's ability to perform effectively in an organization. However, research on the performance review process has been limited in two ways. First, this research has generally ignored the interpersonal context within which reviews take place (Wexley & Klimoski, 1984). Instead, much of this research "has treated raters as faulty but motivationally neutral elements of the appraisal process and has concentrated on improving their accuracy by minimizing these faults with improved rating scale formats, and training" (Hogan, 1987: 364). Second, most of the studies of the performance appraisal review and feedback process have used employees' reactions to appraisal, such as their self-reported motivation to improve performance, as the dependent variables for evaluating reviews (Bernardin & Beatty, 1984). Whether performance appraisal reviews actually change subsequent em-

We wish to thank two anonymous reviewers from this journal for their comments on an earlier draft.

ployee performance and work attitudes is still very much an open question. Many managers are skeptical about the idea that reviews affect performance (Mohrman, Resnick-West, & Lawler, 1989).

This study investigated the efficacy of performance appraisal in organizational settings by considering not just the content of reviews but also the typically overlooked interpersonal context within which performance appraisals occur. In addition, we adopted a longitudinal design in order to study whether performance appraisal reviews result in actual changes in employee performance and job satisfaction. Specifically, we were interested in how the content of appraisal interviews affected employees' reactions to reviews and their subsequent work performance and job attitudes, and in whether the supervisor-subordinate interpersonal context within which reviews take place moderates these effects.

THEORETICAL BACKGROUND AND HYPOTHESES

The Interpersonal Context of Appraisals

Informally, feedback between a supervisor and subordinate can occur at any time. A formal performance appraisal interview, therefore, is only one incident in the ongoing relationship between a supervisor and subordinate that unfolds day in and day out, year after year. As such, the effect of such once-a-year reviews on employees' motivation, performance, satisfaction, attitudes toward their companies, supervisors, and even reactions to appraisals should be considered within the broader context of ongoing supervisor-subordinate interpersonal relationships. Clark and Reis described a relationship as an interdependence between two people in which their "behaviors, emotions and thoughts are mutually and causally interconnected . . . a relationship is close to the extent that it endures and involves strong, frequent, and diverse causal interconnection" (1988: 611). By definition, the jobs of supervisor and subordinate are interconnected; the success of one ultimately depends on successful performance by the other. Beer stated that "there is no substitute for a good supervisor-subordinate relationship . . . without such a relationship, no performance appraisal system can be effective" (1981: 32).

Surprisingly, the interpersonal relationship between a supervisor and subordinate as a contextual factor affecting the success of a performance appraisal review has received only limited attention. Burke and Wilcox (1969) found that the level of openness in supervisor-subordinate communication was positively related to subordinate satisfaction with company, job, and the performance appraisal. Other research has shown that perceptual congruence—the extent to which a subordinate and supervisor are perceptually aware of each other's work-related attitudes—affects the supervisor's perceptions of the subordinate's performance and both the subordinate's job satisfaction and evaluation of the supervisor's leadership performance (Pulakos & Wexley, 1983; Wexley, Alexander, Greenawalt, & Couch, 1980; Wexley & Pulakos, 1983). Finally, researchers studying leader-

member exchange and the vertical dyadic linkage between managers and their supervisors have found that subordinates who are part of their supervisors' in-group experience greater trust in their supervisors, interact more with them, and receive more support and more informal and formal rewards than out-group members (Dansereau, Graen, & Haga, 1975; Dienesch & Liden, 1986; Graen, Novak, & Sommerkamp, 1982).

As Wexley and Klimoski (1984) noted, research on vertical dyadic linkage has implied that supervisors are more likely to allow in-group subordinates to participate in appraisals and are likely to see them as more competent than out-group subordinates. The degree of perceived trust and loyalty between supervisors and subordinates is also likely to affect the extent to which they discuss issues important to the subordinates, such as rewards and promotion opportunity (Beer, 1981), in appraisal interviews. In addition, subordinates may self-impose, or "enact," limitations or barriers to their willingness to participate in meaningful discussions in such interviews on the basis of other interactions with their supervisors (Weick, 1977, 1979). Therefore, we expected that subordinates' reports of what took place during appraisal interviews would be related to the quality of supervisor-subordinate relationships.

Two characteristics of effective performance appraisal reviews frequently mentioned in the relevant literature are (1) the degree to which the evaluation is based on behavioral criteria such as goals, specific behaviors, or results and (2) whether the subordinate has an opportunity to participate in the review (Burke, Weitzel, & Weir, 1978; Burke & Wilcox, 1969; Dipboye, 1985; Dipboye & de Pontbriand, 1981; Greller, 1978; Landy, Barnes, & Murphy, 1978; Landy, Barnes-Farrell, & Cleveland, 1980; Nemeroff & Wexley, 1979). In addition, Lawler, Mohrman, and Resnick (1984) suggested that a third characteristic of reviews, the presence of discussion of career issues, is important to subordinates. Unlike feedback that is directed at performance of the work itself, career discussions let people know where they stand by focusing on how performance can lead to desired career outcomes. We selected these three review variables—evaluation criteria, opportunity to participate, and career discussion—as measures of the content of appraisal interviews.

Hypothesis 1: Supervisor-subordinate interpersonal relations before a performance appraisal review will be positively related to the degree to which the evaluation (a) was based on behavioral, results-oriented criteria, (b) covered career issues as well as performance issues, and (c) included an opportunity for the subordinate being reviewed to participate in the discussion.

The above discussion also suggests that subordinate reactions to a performance appraisal interview depend on more than just its content. Subordinate satisfaction with a review and evaluations of its quality and utility will also depend on the quality of the interpersonal relations between the supervisor and the subordinate at the time of the review.

Hypothesis 2a: The three content variables specified in Hypothesis 1 will be positively related to three measures of employee reactions to a performance appraisal review—ratings of satisfaction with the review, its quality, and its utility.

Hypothesis 2b: There will be a significant interaction effect between supervisor-subordinate relations and the three content variables on ratings of satisfaction with a review, its quality, and its utility.

Changing Job Performance and Job Satisfaction

Few performance appraisal studies have tested the effects of appraisal interviews on actual performance measures, and most of these have been methodologically limited (Bernardin & Beatty, 1984). Studies that have tested such effects have typically relied on simple correlations between employee reactions to an appraisal and job performance measured at the same time. But as Dorfman, Stephan, and Loveland (1986) observed, employees who are good performers may report higher-quality reviews, rather than appraisal reviews actually leading to higher performance. To evaluate the true effectiveness of a performance review, researchers must determine the change in performance that has occurred since a review. This can be done statistically, by controlling for the effects of performance ratings made before the review on ratings made after the review. In one of the few studies to measure actual changes in performance as a result of a performance review, Dorfman and colleagues (1986) found that appraisal interviews did not result in a change in job performance measured one year later. However, their inability to find an effect of appraisal on subsequent performance may have been caused by the severe range restriction in their performance measures; their pre- and post-review performance ratings averaged 3.48 and 3.51 on a 4-point scale, with standard deviations of only .33 and .35, respectively.

To summarize, although it is often assumed that performance appraisal affects employee performance, empirical support for this assumption is limited. Furthermore, as with reactions to an appraisal, how much subordinate performance changes as the result of the content of an appraisal review is likely to depend on the ongoing interpersonal relationship between the supervisor and the subordinate involved.

Hypothesis 3a: The three content variables specified in Hypothesis 1 will be positively related to a change in subordinate performance, with performance after an appraisal review differing from performance before the review.

Hypothesis 3b: The interaction of interpersonal relations and the content variables will have a significant effect on the change in performance specified in Hypothesis 3a.

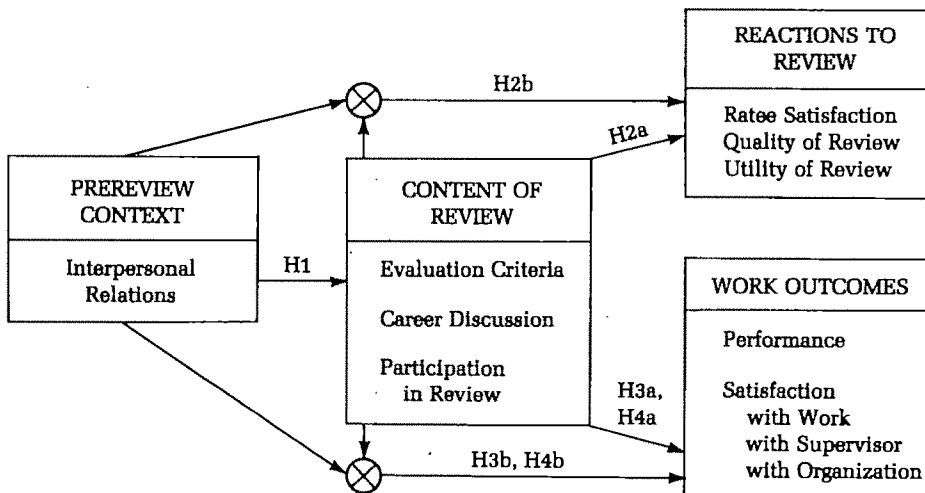
Change in performance is not the only possible outcome of an effective performance appraisal; an employee's satisfaction with work, supervisor, and organization may also be affected. Systems theorists have long argued that to be successful, organizational practices must integrate the needs of organizations and those of individual actors within them (Argyris, 1964). For an organization to survive and grow, it requires sufficient amounts of both formal achievements, the products or services of its work groups, and group need satisfaction, the maintenance inputs "arising out of the interactions of the role incumbents themselves" (Berrien, 1976: 48). Performance appraisal reviews would seem to be an important vehicle for exchanging expectations that can affect group need satisfaction. As with performance, ongoing supervisor-subordinate relationships are likely to affect how much a review changes employee attitudes.

Hypothesis 4a: The three content variables specified in Hypothesis 1 will be positively related to a difference in subordinate satisfaction with work, supervisor, and organization before and after a performance appraisal review.

Hypothesis 4b: The interaction of supervisor-subordinate relations and the content variables will have a significant effect on subordinate satisfaction with work, organization, and supervisor.

Figure 1 summarizes the expected effects of the three content variables—evaluation criteria, opportunity to participate, and career discussion—on subsequent subordinate performance and satisfaction. But as the figure shows, the efficacy of an appraisal review should be considered within the context of the supervisor-subordinate interpersonal relationship

FIGURE 1
Model of Hypothesized Relationship



involved. First, we expected the interpersonal relationship that existed before the review took place to positively affect the three content variables; the arrow labeled "H1" represents this prediction. Second, we expected the content variables to have a positive, direct effect on subordinate reactions to reviews (H2a). However, we also expected the quality of the supervisor-subordinate interpersonal relationship to moderate the content variables' efficacy (H2b), with reactions to the review differing with this content-by-context interaction. Third, we expected the content variables to have positive, direct effects on subsequent performance (H3a) and satisfaction (H4a) and to interact with the quality of the supervisor-subordinate interpersonal relationship (H3b and H4b).

METHODS

Sample and Design

The sample in this study consisted of exempt employees, mostly professionals and managers, and their supervisors in ten strategic business units of a large multinational, multiindustry corporation. The business units were in different industries, and the units' products and the economic conditions of their industries varied widely. Industries ranged from new, high-technology ones to mature ones. Each business unit had developed its own performance appraisal system.

The compensation system was uniform across the corporation. "Pay for performance" was an established ethic, but there was no direct link between pay decisions and performance appraisal ratings. Instead, pay decisions were based on managerial evaluations of each employee's standing relative to others and constrained by the available salary budget.

Questionnaires designed to study the organization's performance appraisal practices were administered to randomly selected supervisor-subordinate pairs at two times, three to four months apart, with the subordinates' performance reviews occurring in between. In all cases, the immediate supervisor was the sole appraiser. Prereview data were collected in September and October; the reviews were conducted from October to December, though some ran into early January; and the second wave of data collection took place in late December and January.

Before the reviews occurred, we randomly sampled 593 pairs. Of this group, 530 subordinates and 519 supervisors responded, approximately 89 and 88 percent of the totals. We sent the after-review questionnaires to only these respondents, and 417 subordinates and 391 supervisors responded, 79 and 75 percent, respectively. Most failures to return the second questionnaire were due to turnover, primarily promotion and transfer. Many analyses required completed surveys from both the supervisor and the subordinate in each pair; this requirement further eroded the sample to around 300, despite the high response rates. Some cases were also lost because data on particular variables were missing.

Measures

Independent variables consisted of subordinate responses to a scale assessing interpersonal relations and three variables measuring the content of the reviews. Interpersonal relations were measured before the appraisal interviews. Subordinates responded to the following question: "At the present time my relationship with my supervisor is . . .," followed by seven 7-point semantic differential items—tense-relaxed, cautious-free, distrusting-trusting, bad-good, productive-destructive, friendly-hostile, and pleasant-unpleasant (the last three items were reverse-scored). Responses to these items were averaged to form a general measure of the quality of an interpersonal relationship.

As mentioned previously, the content of the review was evaluated along three dimensions: the criteria upon which the evaluation was based, the presence of career discussion, and the subordinates' opportunity to participate in the appraisal discussion. Scores on the criteria scale consisted of the mean of four 5-point items measuring the extent to which the actual evaluation was based on results achieved, job-related behaviors, skills and abilities, and predetermined goals. The more an evaluation was perceived to be based on behavioral, results-oriented criteria (versus personality traits, impressions, etc.), the better or more appropriate the evaluation criteria were assumed to be. The presence of career discussion was based on the average of two 5-point items assessing the extent to which a subordinate and supervisor discussed career and personal development and specific career development goals. Opportunity to participate was calculated by averaging three 5-point items from Greller's (1978) six-item contribution scale indicating whether or not the employee being reviewed made suggestions about the job, had an impact on how things would be done in the future, and influenced goal setting during the performance review.

The first set of dependent variables, which measured subordinates' reactions to the performance appraisal reviews, was measured along three dimensions: quality, satisfaction, and utility. Quality was measured by averaging subordinates' responses to five semantic differential items regarding the reviews: tense-relaxed, friendly-hostile, constructive-destructive, trusting-distrusting, and open-reserved (the last four items were reverse-scored). Satisfaction with the reviews was measured by the three satisfaction items from Greller (1978) assessing the degree to which subordinates were satisfied, reported accurate and fair evaluations, and felt they would improve working relations with their supervisors. Finally, utility of the review was based on another 3-item scale from Greller measuring the extents to which subordinates felt that the reviews gave them a clearer idea of what their supervisors expected, that they obtained information for making specific changes to facilitate better performance, and that they more clearly understood exact job duties and responsibilities.

Performance and job satisfaction made up the second set of dependent variables. Supervisors rated their subordinates' performance at the time of

the second questionnaire (one to two months after review) on a single-item, 7-point anchored rating scale ranging from 1, "below minimum standards," through 4, "met normal standards," to 7, "far exceeds normal standards." Subordinates rated their job satisfaction one to two months after review on three 7-point items measuring how satisfied they were with the nature of their work, their supervisor, and their company.

Job performance ratings by the supervisors and the three elements of job satisfaction rated by subordinates were also measured before the review. These prereview measures of performance and satisfaction served as control variables and allowed us to determine if performance and satisfaction changed as a result of the performance review.

Finally, we measured each subordinate's recall of the performance rating received from the manager at the time of the review. We included these ratings in our regression analyses to control for the possibility that favorableness of the performance rating may have biased a subordinate's reaction to the appraisal review (Dipboye & de Pontbriand, 1981; Landy et al., 1980).

Analyses

Since the scales differed in numbers of items and response options, scores were standardized prior to analyses. We used simple regression analyses to test Hypothesis 1 and hierarchical regression analyses to test the remaining hypotheses. All regression analyses used listwise deletion of missing data (SPSS Inc., 1986). Listwise deletion computes regression equations only on cases that have complete data on all variables in the full equation. Because listwise deletion results in smaller samples than pairwise deletion, the former results in a more conservative, less powerful test. However, it is more appropriate for determining whether each added variable in a regression equation, and not changes in the sample composition with each additional variable, increases the predicted variance in the dependent measure.

RESULTS

Table 1 presents descriptive statistics and coefficient alphas for the predictor variables, criterion measures, and control variables. Zero-order correlations among all variables also appear in Table 1.

Results supported Hypothesis 1, which stated that the interpersonal context measured one to two months prior to a review would be related to each of the three measures of interview content. Each of the content variables was significantly related to preinterview interpersonal relations: for evaluation criteria, the value of the regression coefficient was .42; for career discussion, it was .21, and for opportunity to participate, it was .18 ($n = 310$, $p < .05$). Even after controlling for the recalled performance rating, we found that the coefficients remained significant, at .39, .18, and .13 ($n = 300$, $p < .05$ or greater).

TABLE 1
Zero-Order Correlations for All Variables Based on Pairwise Deletion of Missing Data^a

Variables	Means	s.d.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Interpersonal context before review	5.33	1.30	(.92)														
2. Evaluation criteria	3.53	0.71	.42*	(.80)													
3. Career discussion	2.53	0.94	.21*	.38*	(.88)												
4. Opportunity to participate	3.80	1.43	.18*	.38*	.34*	(.78)											
5. Recalled performance rating	5.17	1.27	.28*	.42*	.14*	.23*											
6. Performance rating before review	4.97	1.27	.16*	.04	.00	.05	.10*										
7. Satisfaction with work before review	5.51	1.40	.24*	.22*	.02	.17*	.21*	.04									
8. Satisfaction with supervisor before review	5.01	1.61	.70*	.44*	.21*	.22*	.23*	.16*	.33*								
9. Satisfaction with company before review	5.58	1.31	.22*	.24*	.07	.10*	.06	-.03	.33*	.27*							
10. Quality of review	5.27	1.34	.53*	.49*	.33*	.30*	.39*	.01	.19*	.48*	.16*	(.89)					
11. Satisfaction with review	4.23	1.54	.43*	.64*	.42*	.39*	.45*	.10*	.17*	.48*	.23*	.60*	(.86)				
12. Utility of review	3.59	1.44	.28*	.44*	.48*	.45*	.12*	.06*	.10*	.32*	.13*	.33*	.59*	(.87)			
13. Performance rating after review	5.10	1.24	.18*	.30*	.14*	.08	.53*	.23*	.25*	.16*	.02*	.35*	.31*	.12*			
14. Satisfaction with work after review	5.50	1.29	.21*	.27*	.15*	.21*	.28*	-.09†	.52*	.24*	.30*	.25*	.29*	.18*	.19*		
15. Satisfaction with supervisor after review	5.10	1.53	.54*	.51*	.28*	.30*	.32*	.04	.21*	.60*	.23*	.55*	.58*	.38*	.21*	.36*	
16. Satisfaction with company after review	5.62	1.24	.16*	.27*	.08†	.17*	.11*	.00	.19*	.14*	.53*	.18*	.25*	.15*	.10†	.33*	.23*

^a Statistics in parentheses are alpha reliabilities.

† $p < .10$

* $p < .05$

Employees Reactions to Appraisal Interviews

Hypothesis 2a predicted that the three content variables would affect subordinates' ratings of their satisfaction with the reviews, their quality, and their utility, and Hypothesis 2b predicted the additional effect of an interaction between each content variable and interpersonal context. We conducted separate tests for each content variable. Because we measured the interpersonal context before the reviews took place, we entered context into the equation first, followed by subordinate recall of the performance rating received (favorableness), a content variable, and finally, the cross-product of scores on measures of the interview content and the interpersonal context.¹

As can be seen in Table 2, results supported Hypothesis 2a for all three dependent variables; a significant increase in R^2 was found for each of the content variables (evaluation criteria, career discussion, and opportunity to participate). In contrast, Hypothesis 2b was not supported; none of the three cross-products of a content variable and the interpersonal context was significantly related to ratings of satisfaction with reviews, their quality, or their utility.

Possible interactions of the favorableness ratings with either the content or interpersonal context measures were also tested by entering the two two-way cross-product terms, recalled ratings with interpersonal relations and recalled ratings with the content variables, and the three-way cross-product of interpersonal relations, recalled rating, and the content variables. These cross-products added no significant incremental variance to the regression equations.

Changes in Satisfaction and Performance

Hypothesis 3a predicted that the three content variables would have a positive effect on performance; Hypothesis 3b predicted that the interaction of interpersonal relations and each content variable would affect performance. We conducted separate tests for each content variable, with the predictor variables hierarchically regressed on performance one to two months after the review and entered in the following order: (1) prereview supervisor-subordinate interpersonal relationship, (2) manager's evaluation of employee performance one to two months before the review, (3) a content variable, and (4) the cross-product of interpersonal relations and the content variable. We did not enter the subordinate's recalled rating because we did not expect it to bias the supervisors' post-appraisal evaluations.

¹ Hierarchical regression analyses were also conducted with the three appraisal content variables entered simultaneously at step two and interpersonal relations entered last. Interpersonal relations measured one to two months before the performance appraisal interview had a significant effect on all three measures of subordinate reaction to the appraisal review, even after we controlled for the performance evaluation received in the interview and the content of the review.

TABLE 2
Results of Hierarchical Regression Analysis for Reaction to Performance Appraisal Review^a

Steps	Predictors	Dependent Variables									
		Satisfaction with Appraisal					Quality of Appraisal				
		Content Variables		Career		Participation	Content Variables		Career		Participation
		Criteria	Discussion	Participation	Participation	Criteria	Discussion	Participation	Criteria	Discussion	Participation
1	Interpersonal context before review	.18***	.18***	.18***	.18***	.27***	.27***	.27***	.08***	.08***	.08***
2	Recalled performance rating	.14***	.14***	.14***	.14***	.09***	.09***	.09***	.01***	.01***	.01***
3	Content of review Criteria	.14***				.05***			.10***		
	Career discussion		.08***				.04***			.16***	
	Opportunity to participate			.07***				.04***			.17***
4	Context by content	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
	Adjusted R ²	.45***	.39***	.38***	.38***	.41***	.40***	.39***	.18***	.25***	.24***

^a n = 292 for all analyses. Coefficients are changes in R² for each step.

*** p < .001

Table 3 presents results of the hierarchical regression analyses. As would be expected, the preappraisal measure of performance accounted for the vast majority of the predicted variance in performance measured one to two months after an appraisal review. Because they include the two performance measures, these analyses provide a stringent test of the effect of the content variables on performance and allow us to determine if the performance appraisal reviews resulted in a change in performance.

Despite the overwhelming effect of past performance on subsequent performance, Hypothesis 3a was supported. Both career discussion and evaluation criteria were significantly related to changes in ratings of performance. Opportunity to participate had a marginal effect on performance change. Although these effects are small—a change in R^2 of only .01 for each variable—it is important to recall that average performance was already high before the review (4.97 on 7-point scale) and that large changes would not be expected. In contrast, Hypothesis 3b was not supported. None of the cross-products of interpersonal relations and content variables had a significant effect on performance beyond that due to their main effects.

Five-step hierarchical regressions were used to test Hypothesis 4a, which predicted that the content of the reviews would be related to changes in each of the three job satisfaction variables, and Hypothesis 4b, which stated that the interpersonal context would moderate the effect of appraisal content on job satisfaction. In this case, we added the favorableness of a performance rating to the equation after step 2, in which a prereview job satisfaction rating was entered, and before the content variable was entered, to control for a possible biasing effect of favorableness on subsequent subordinate ratings of satisfaction with work, supervisor, and organization. The cross-product of interpersonal relations and the content variables again was entered into the equation last.

Results supported the predictions of Hypothesis 4a regarding satisfaction with work and supervisor and to a lesser degree supported predictions for satisfaction with the employing organization. These results are presented in Table 3. The more evaluations were based on behavioral, results-oriented criteria, the more career issues were discussed, and the more subordinates had an opportunity to participate in the discussion, the greater their satisfaction with work and supervisor. Only one of the review variables, evaluation criteria, was significantly related to changes in satisfaction with the organization.

Support emerged for Hypothesis 4b's predictions for satisfaction with the organization. Significant interactions between interpersonal relations and opportunity to participate and between interpersonal relations and career discussion affected subordinate satisfaction with the organization. The unstandardized beta weights were negative for both cross-products; for interpersonal context by career discussion, the value was $-.49$, and for context by participation it was $-.53$, indicating that good interpersonal relations between a supervisor and subordinate compensate for a poor appraisal interview, and conversely, a good interview compensates for poor interper-

sonal relations. Results did not support the predictions of Hypothesis 4b for satisfaction with work or supervisor; no other cross-product terms were significant.

As for Hypothesis 3, we also tested possible interactions of the favorableness of the performance ratings with each content variable and interpersonal context measures. Neither the two two-way cross-products, favorableness by interpersonal relations and favorableness by content, nor the three-way cross-products of favorableness, interpersonal relations, and the content variables reached significance for any of the 12 regression equations. (These results are available from the first author.)

DISCUSSION

Organizations are often dissatisfied with the efficacy of performance appraisal (Campbell & Barron, 1982; Locher & Teel, 1977). Our results show that performance appraisal can influence important organizational outcomes such as performance and satisfaction.

One important conclusion of this study is that performance appraisal reviews do not take place in a vacuum but occur within the context of the interpersonal relationships between supervisors and subordinates. This research shows that the content of an appraisal—the subordinate's opportunity to participate in the discussion, the criteria on which the performance evaluation was based, and the discussion of issues important to the subordinate's career—is in part a function of subordinate and supervisor's ongoing interpersonal relationship.

Previous research has found subordinates' satisfaction with reviews to be correlated with their participation and a discussion of work goals (Burke, Weitzel, & Weir, 1978; Burke & Wilcox, 1969; Dipboye & de Pontbriand, 1981; Greller, 1978; Landy et al., 1978; Landy et al., 1980; Nemeroff & Wexley, 1979). Our results suggest that those findings may in part have reflected interpersonal relationships between subordinates and supervisors. But our findings also show that, independent of interpersonal relationships, reactions to reviews are related to their content.

Although reactions to reviews are of interest in and of themselves, a more fundamental issue is whether reviews can change employees' performance and their attitudes about their work environments. In our data, those changes occurred. Small but significant changes in employee performance as rated by the supervisors as well as in attitudes toward work, supervisor, and organization emerged, even after we controlled for preappraisal measures of performance and job attitudes.

Despite previous research showing that employees do not regard supervisors as important sources of performance feedback compared to their jobs and their own perceptions (Greller & Herold, 1975), performance feedback generally is regarded as the means by which performance appraisal causes

changes in employee behavior. Although we certainly would not disagree that feedback is important, other explanations for the effects of the appraisal reviews on subordinate performance and satisfaction must be considered, especially in view of this study's findings regarding the effects of career discussion and participation on performance and satisfaction. For example, within the performance appraisal context, supervisors are important in their role as representatives of the employing organization as well as experts on a subordinate's job. As representatives of the organization, supervisors can listen to subordinates' suggestions and provide important path-clearing resources that allow the subordinates to perform effectively. Supervisors can also provide information about what it takes to be successful in the organization—career information. In this way, performance reviews can satisfy important personal growth and development needs of subordinates.

Participation has both real and symbolic importance. First, it gives employees real control over their work performance. For example, a supervisor who exhibits "participative leadership" (House & Mitchell, 1974) takes action in response to a subordinate's suggestions and opinions, removing obstacles that impede progress toward the subordinate's work and career goals. Such behavior may have been responsible for the post-review change in subordinate performance reported by supervisors who gave their subordinates a greater opportunity to participate in the appraisal interview.

Second, participation has symbolic importance, signaling an employee that a supervisor is fair. By its very nature, judging performance is an inferential process (Nathan & Alexander, 1985), one in which a supervisor's subjectivity can produce a great deal of anxiety or uncertainty in the mind of a subordinate. In our study, subordinates reacted more favorably to reviews that focused on the "right" criteria—goals, behaviors, and results—than to other reviews; use of those criteria may have signaled that an appraisal was conducted fairly. In the presence of uncertainty, people will interpret a fair or rational procedure favorably (Feldman & March, 1981).

Our results are more encouraging than those of Dorfman and colleagues (1986), who found that performance appraisal review did not result in a change in subordinate performance. The most likely explanation for this difference is that the lack of effect those authors reported was a result of the extreme leniency of and severe range restriction in their prereview performance measures. Although some leniency and range restriction did exist in our data as well, it was much lower ($\bar{x} = 4.97$, *s.d.* = 1.27, on a 7-point scale). However, job and industry differences and differences in the amount of time between performance ratings also may have been contributing factors.

By using a longitudinal and highly controlled design, albeit with statistical rather than experimental controls, we were able to eliminate many of the limitations and alternative explanations that have hampered previous studies. Still, limitations of this study should be noted. First, since all the measures were perceptual, common method variance may have been a prob-

lem. However, examination of the pattern of relationships suggests that subordinate reactions to the appraisal interviews were more than just generalized affective reactions. Reactions to the appraisal were differentially related to different aspects of the appraisal content. For example, satisfaction with the review was most strongly related to the degree to which the appraisal was based on behavioral, results-oriented criteria. In contrast, the perceived utility of the review was more closely related to career discussion and participation. Finally, the quality of the appraisal, the most general dimension and the one measured by impressionistic ratings of bipolar descriptors rather than specific job-related items, was most strongly related to the interpersonal relations between the supervisor and the subordinate. Thus, despite the perceptual nature of the data, subordinates still made meaningful distinctions among perceptions of their relationship with their supervisors, their recall of what took place during the interviews, and their reactions to the reviews.

In this study, we controlled for the effect of the favorableness of the performance rating received. In addition, using hierarchical regression ensures a conservative test of the variable entered last in the regression equation. In fact, given the number of control variables entered in these analyses, our results should be considered as indicating a lower limit for the impact of the content variables on reactions to reviews, job performance, and satisfaction.

Although the effects of the performance reviews were not large, we emphasize that findings were actually change scores obtained by first regressing the post-appraisal dependent variables on the same variable measured before the review. Given the relatively high performance and satisfaction of the subordinates prior to the review (see Table 1) and the likely presence of feedback from other sources throughout the year, such as the work itself or co-workers, only a small amount of additional improvement is likely to be attributable to this once-a-year event. In addition, yearly performance appraisal was a normal event in this corporation; in organizations in which appraisal reviews are less common, we might have obtained a larger effect. Still, despite these circumstances and the control for the favorableness of the rating, significant changes in performance and satisfaction were found one to two months after the review.

In conclusion, our intent is to point out that the interpersonal context within which a performance appraisal review takes place has important consequences for its effectiveness. Our data indicate that the relationship of a supervisor and subordinate creates an important social context that affects both the content of a review and the subordinate's reactions to it. The content of the review in turn affects the supervisor's ratings of subsequent performance and the subordinate's attitudes toward work, supervisor, and even organization. More research is needed that focuses on the complex social system within which performance is assessed and feedback is given and on actual changes in job performance and satisfaction.

REFERENCES

- Beer, M. 1981. Performance appraisal: Dilemmas and possibilities. *Organizational Dynamics*, 9(3): 24-36.
- Bernardin, H. J., & Beatty, R. W. 1984. *Performance appraisal: Assessing human behavior at work*. Boston: Kent.
- Berrien, F. K. 1976. A general systems approach to organizations. In M. D. Dunnette (Ed.), *Handbook of industrial and organizational psychology*: 41-62. Chicago: Rand McNally.
- Burke, R. J., Weitzel, W., & Weir, T. 1978. Characteristics of effective employee performance review and development interviews: Replication and extension. *Personnel Psychology*, 31: 903-919.
- Burke, R. J., & Wilcox, D. S. 1969. Effects of different patterns and degrees of openness in superior-subordinate communication of subordinate job satisfaction. *Academy of Management Journal*, 12: 319-326.
- Campbell, B. C., & Barron, C. L. 1982. How extensively are human resource management practices being utilized by the practitioners? *Personnel Administrator*, 27(5): 67-71.
- Clark, M. S., & Reis, H. T. 1988. Interpersonal processes in close relationships. *Annual Review of Psychology*, 39: 609-672.
- Dansereau, R., Jr., Graen, G., & Haga, W. J. 1975. A vertical dyad linkage approach to leadership within formal organizations: A longitudinal investigation of the role making process. *Organizational Behavior and Human Performance*, 13: 46-78.
- Dienesch, R. M., & Liden, R. C. 1986. Leader-member exchange model of leadership: A critique and further development. *Academy of Management Review*, 11: 618-634.
- Dipboye, R. L. 1985. Some neglected variables in research on discrimination in appraisals. *Academy of Management Journal*, 10: 116-127.
- Dipboye, R. L., & de Pontbriand, R. 1981. Correlates of employee reactions to performance appraisal systems. *Journal of Applied Psychology*, 66: 248-251.
- Dorfman, P. W., Stephan, W. G., & Loveland, J. 1986. Performance appraisal behavior: Supervisor perceptions and subordinate reactions. *Personnel Psychology*, 39: 579-598.
- Feldman, M. S., & March, J. G. 1981. Information in organizations as signal and symbol. *Administrative Science Quarterly*, 26: 171-186.
- Graen, G., Novak, M., & Sommerkamp, P. 1982. The effects of leader-member exchange and job design on productivity and satisfaction: Testing a dual attachment model. *Organizational Performance and Human Performance*, 30: 109-131.
- Greller, M. M. 1978. The nature of subordinate participation in the appraisal interview. *Academy of Management Journal*, 21: 646-658.
- Greller, M. M., & Herold, D. M. 1975. Sources of feedback: A preliminary investigation. *Organizational Behavior and Human Performance*, 13: 244-256.
- Hogan, E. A. 1987. Effects of prior expectations on performance ratings: A longitudinal study. *Academy of Management Journal*, 30: 354-368.
- House, R. J., & Mitchell, T. R. 1974. Path-goal theory of leadership. *Journal of Contemporary Business*, 3(4): 81-98.
- Landy, F. L., Barnes, J. L., & Murphy, K. R. 1978. Correlates of perceived fairness and accuracy of performance evaluation. *Journal of Applied Psychology*, 63: 751-754.
- Landy, F. L., Barnes-Farrell, J. L., & Cleveland, J. N. 1980. Correlates of perceived fairness and accuracy of performance evaluation: A follow-up. *Journal of Applied Psychology*, 65: 355-356.

- Lawler, E. E., Mohrman, A. M., & Resnick, S. 1984. Performance appraisal revisited. *Organizational Dynamics*, 13(1): 20-35.
- Locher, A. H., & Teel, K. S. 1977. Performance appraisal—A survey of current practices. *Personnel Journal*, 56: 245-247;254.
- Mohrman, A. M., Resnick-West, S., & Lawler, E. E. 1989. *Designing performance appraisal systems*. San Francisco: Jossey-Bass.
- Nathan, B. R., & Alexander, R. A. 1985. The role of inferential accuracy in performance ratings. *Academy of Management Review*, 10: 109-115.
- Nemeroff, W. F., & Wexley, K. N. 1979. An exploration of the relationships between performance feedback interview characteristics and interview outcomes as perceived by managers and subordinates. *Journal of Occupational Psychology*, 52: 25-34.
- Pulakos, E. D., & Wexley, K. N. 1983. The relationship among perceptual similarity, sex, and performance ratings in manager-subordinate dyads. *Academy of Management Journal*, 26: 129-139.
- SPSS Inc. 1986. *SPSS⁺ user's guide* (2d ed.). Chicago: SPSS Inc.
- Weick, K. E. 1977. Enactment process in organizations. In B. M. Staw & G. R. Salancik (Eds.), *New directions in organizational behavior*: 267-300. Chicago: St. Clair Press.
- Weick, K. E. 1979. *The social psychology of organizing* (2d ed.). New York: Random House.
- Wexley, K. N., Alexander, R. A., Greenawalt, J. P., & Couch, M. A. 1980. Attitudinal congruence and similarity as related to interpersonal evaluations in manager-subordinate dyads. *Academy of Management Journal*, 23: 320-330.
- Wexley, K. N., & Klimoski, R. 1984. Performance appraisal: An update. In K. M. Rowland & G. R. Ferris (Eds.), *Research in personnel and human resources management*, vol. 2: 35-79. Greenwich, CT: JAI Press.
- Wexley, K. N., & Pulakos, E. D. 1983. The effects of perceptual congruence and sex on subordinates' performance appraisals of their managers. *Academy of Management Journal*, 26: 666-676.

Barry R. Nathan received his Ph.D. degree in industrial-organizational psychology from the University of Akron. He is a visiting associate professor of management at the Graduate School of Business of the University of Wisconsin-Madison. His current research interests include employee involvement organizations, performance feedback and evaluation, and employee selection.

Allan M. Mohrman, Jr. received his Ph.D. degree in organizational behavior from Northwestern University. He is the associate director of and a research scientist for the Center for Effective Organizations at the University of Southern California School of Business Administration. His current research interests include organizational change, performance management, and lateral forms of organizations.

John F. Milliman received an M.A. degree in public health from the University of California, Los Angeles, and currently is a doctoral candidate in the Department of Management and Organization at the University of Southern California. His current research interests include international management, performance appraisal, careers, and reward systems.

UNDERSTANDING TECHNOLOGY-STRUCTURE RELATIONSHIPS: THEORY DEVELOPMENT AND META-ANALYTIC THEORY TESTING

C. CHET MILLER

Baylor University

WILLIAM H. GLICK

YAU-DE WANG

GEORGE P. HUBER

University of Texas at Austin

Theoretical models concerning technology-structure relationships typically are limited to one technology variable, one structure variable, and one contingency variable. This study draws on three decades of technology-structure research to develop and test more encompassing and potentially more valid models. Contrary to the most common explanations of mixed results on technology-structure relationships, the results of our meta-analytic theory testing indicate that the use of different definitions of technology and variation in organizational size generally do not affect these relationships. The results also indicate that two previously neglected contingency variables, professionalization and industrial sector, generally do not affect technology-structure relationships, but two methods variables, industrial sector heterogeneity and the size of the units of analysis, do affect them.

Many organization theorists have posited the existence and importance of technology-structure relationships (e.g., Lincoln, Hanada, & McBride, 1986; Marsh & Mannari, 1981). Other organization theorists have challenged that position, arguing that such relationships do not exist (e.g., Ballew, 1982; Blau, Falbe, McKinley, & Tracy, 1976; Donaldson, 1976; Mohr, 1971).

Three decades of empirical research have not produced consistent support for either of the above positions. In her pioneering research, Woodward (1958, 1965) found that technological characteristics shaped the structural characteristics of 82 English manufacturing organizations. However, in the second major technology-structure research program, Hickson, Pugh, and Pheysey (1969) found little evidence for systematic technology-structure re-

Support for this research was provided by a grant from the U.S. Army Research Institute for the Behavioral and Social Sciences (Grant # MDA903-85-K-0404; George P. Huber, principal investigator, William H. Glick, co-principal investigator). The authors wish to thank Richard L. Daft, Louis W. Fry, John W. Slocum, and three anonymous reviewers for their detailed and useful comments on earlier drafts. This study has also benefited from the thoughtful comments of the participants in the First Annual Texas Conference on Organizations (May 1986).

relationships. Instead, they found evidence suggesting that organizational size is a much more important determinant of structural characteristics than are technological characteristics. Further research has produced a bewildering array of confusing and contradictory findings (Barley, 1986; Fry, 1982).

Proponents of the existence of technology-structure relationships have sought to explain these confusing findings by including contingency variables in their theoretical models. Typically, their models have contained only three variables—one technology variable, one structure variable, and one contingency variable. The general form of the simple three-variable models is the following: *X* is associated with *Y* only in context *Z*. For example, work flow integration is positively associated with centralization only in small organizations.

Although parsimony is useful for some purposes, the lack of systematically validated technology-structure models (Barley, 1986) stands as a challenge to a field of inquiry that is three decades old. One purpose of this study was to develop more encompassing and potentially more valid theoretical models concerning three technology-structure relationships: routineness and centralization, routineness and formalization, and routineness and specialization. We selected routineness for study because we believe it underlies each of the major technology definitions that organization theorists have investigated (Fry, 1982). In other words, as is detailed below, technological routineness appears to be a higher-order technology construct underlying work flow integration, routinization, and production continuity. Centralization of decision-making authority, or the extent to which decision-making authority is retained at or near the top of a hierarchy; formalization of rules and standard operating procedures, or the extent to which well-specified rules and procedures are intended to guide behavior; and specialization of labor—the extent to which an organization's tasks are divided into narrow domains and assigned to specific individuals and departments—were selected for study because they are the three most important and popular organizational structure variables (Fry, 1982).

A second purpose of the present study was to test the models of the three technology-structure relationships using a meta-analytic technique designed to test multivariate theories (Hedges & Olkin, 1985). We tested the three theoretical models with a data base consisting of 31 published studies. The results of the theory-testing meta-analysis facilitated our ability to achieve two additional purposes: (1) to develop implications for the design of organizations and (2) to revise our more encompassing models to reflect a systematic cumulation of three decades of research.

A final purpose of this study was to illustrate a form of theory building that focuses on explaining variation in a relationship rather than variation in a single dependent variable. By considering simultaneously several factors that affect a relationship, we developed a richer understanding of the context and processes. This form of theory building is useful especially when multiple contingency factors may influence a hypothesized relationship.

TECHNOLOGY-STRUCTURE MODELS

Three possible technology-structure models are: (1) routineness is positively associated with centralization, (2) routineness is positively associated with formalization, and (3) routineness is positively associated with specialization. The first model is based on the argument that increased routineness makes increased centralization more feasible because routineness simplifies coordination needs and reduces the number of novel decisions that must be made. Similarly, the second model is based on the argument that routineness reduces the number of novel decisions and consequently promotes the specification of rules and standard operating procedures. The third model is based on the argument that increased routineness allows greater specialization because large-scale repetitive processes can be decomposed into sub-components performed by specialized people and equipment.

One or more of these three rudimentary models has been applied either alone or in conjunction with a single contingency variable in most research on technology and structure. However, we posited a series of contingency hypotheses for each of three more encompassing models. The hypotheses reflect three sets of variables: two frequently cited contingency variables, definition of routineness and organizational size; two newly proposed contingency variables, professionalization and industrial sector; and three methods variables, industrial sector heterogeneity, the average size of the units of analysis, and similarity of data sources.

Frequently Cited Contingency Variables

Definition of routineness. Researchers have most frequently cited the use of different definitions of technology as the cause of the variation in technology-structure findings (Ford & Slocum, 1977; Fry, 1982; Fry & Slocum, 1984; Gerwin, 1979, 1981; Reimann & Inzerilli, 1981; Withey, Daft, & Cooper, 1983). A work flow definition, a routinization definition, and a production continuity definition have each been used in more than five technology-structure studies.¹ Technology defined as work flow integration refers to the degree of automation, continuity, and rigidity inherent in the basic work flow of any organization (Hickson et al., 1969); technology defined as routinization refers to the level of variety inherent in an organization's work (Hage & Aiken, 1969; Perrow, 1967); and technology defined as production continuity refers to the consistency of units of throughput as

¹ In addition to these three frequently studied technology definitions, two recent reviews (Fry, 1982; Fry & Slocum, 1984) discussed operating variability (Pugh, Hickson, Hinings, & Turner, 1969), interdependence (Thompson, 1967), and manageability (Mohr, 1971). We did not use operating variability here because it was conceptualized as an indicator of organizational charter, not routineness, and because only two relevant studies have employed it. Interdependence was excluded because too few studies relevant for this research have used it. We classified the one relevant study using manageability with the routinization studies because manageability and routinization are conceptually similar (Withey et al., 1983).

reflected in an organization's level of mechanization or mass production orientation (Blau et al., 1976; Khandwalla, 1974).

These three definitions of technology can be interpreted as being related or unrelated. If they are unrelated, we should expect different relationships between each definition of technology and any particular structure variable. If, however, they are related strongly, we may treat the three definitions of technology as three dimensions of a single higher-order technology construct (Fry, 1982; Withey et al., 1983). Fry noted that "Comstock and Scott (1977), Overton, Schneck, and Hazlett (1977), Galbraith (1977), Pfeffer (1978), Van de Ven and Ferry (1980), and Slocum and Sims (1980) imply that there is a higher level dimension of task predictability or uncertainty in technology in spite of the different theoretical definitions" (1982: 533). Thus, whether a study's focus is work flow integration, routinization, or production continuity, the underlying technology construct may be the same.

Tentatively, we adopted the position that the three definitions of technology are strongly related and that there is one underlying technology construct called routineness. We viewed this as a tentative assumption because there are some differences among the three conceptual definitions and because reviewers of the technology-structure literature have almost unanimously attributed the mixed empirical results to the use of these different definitions. Our tentative hypothesis was:

Hypothesis 1: Relationships between routineness and centralization, formalization, and specialization are affected negligibly by the specific definition of routineness being considered.

Organizational size. One of organization theory's most spirited debates involves the relative importance of technological characteristics and organizational size as determinants of structural characteristics. Proponents of the importance of organizational size have argued that top-level managers in large organizations are forced to decentralize to overcome the basic logistical problems of controlling and coordinating many individuals and subunits, that codified rules and standard operating procedures follow this decentralization as top management seeks alternative methods of control, and that large organizations enjoy economies of scale that encourage specialization of labor (Child, 1984; Daft, 1986). Empirically, large organizations have been found to be more specialized than small ones and to have more rules, more documentation, more extended hierarchies, and greater decentralization of decision-making authority down such hierarchies (Child, 1976). Thus, because organizational size appears to be an important determinant of structural characteristics, proponents of its importance have argued that it overwhelms any effects of technological characteristics.

The above arguments, however, may have implications only for large organizations. In smaller organizations, size may not have such an overwhelming effect; there is little reason to believe that being small constrains organizations to be centralized, informal, or staffed with generalists. Thus, given fewer constraints on the structure of small organizations, the effects of

technological characteristics are more likely to manifest themselves there. Hickson and colleagues (1969), who studied much larger organizations than Woodward (1965), provided empirical evidence for this idea, finding weaker technology-structure relationships than she had found. Additional related arguments appear below in the section on unit size. Thus, we hypothesized that:

Hypothesis 2: Routineness is more positively related to centralization, formalization, and specialization in small organizations than in large ones.

Performance. Many organization theorists have argued that routineness is more positively related to centralization, formalization, and specialization in organizations with high performance (e.g., Alexander & Randolph, 1985; Reimann & Inzerilli, 1981; Van de Ven & Drazin, 1985). The principal argument relates to the costs associated with high needs for information processing and coordination when routineness is low. Although this argument is frequently cited in theoretical articles, few technology-structure researchers have examined performance empirically (Scott, 1990). Performance was described in only 8 of the 31 studies relevant for the current research, and those studies used very different dimensions of performance. Thus, we were not able to assess the relationships among technology, structure, and performance.

The lack of performance measures in the published research implies that unmeasured effects due to differences in performance may confound tests of our hypotheses. Two conditions must exist, however, before a lack of performance measures yields misleading results concerning other contingency variables: performance must (1) be correlated with the other contingency variables and (2) have important effects on the technology-structure relationships. Although the second condition may be true, we were unable to develop theoretical arguments to indicate that performance is correlated with any of the other contingency variables of interest. Thus, to the extent that the other contingency variables affect technology-structure relationships, we are confident that the effects are independent of performance and would exist whether or not performance was included in the analyses.

Proposed Contingency Variables

The definition of routineness used, organizational size, and performance are frequently cited as variables that play important roles in technology-structure relationships. In this section, we set forth arguments for two other variables that we suggest should be included in theories of technology-structure relationships.

Professionalization. Organizations with large percentages of professionals tend to be low in centralization, formalization, and specialization for several reasons. First, professionals are socialized to maintain high work standards without centralized controls (Saxberg & Slocum, 1968). Centralization and formalization are frequently unnecessary. Second, professionals are highly trained to handle broad, rich jobs. High levels of specialization

tend to be infrequent among professionals. Finally, many professionals resist highly formalized, centralized, or specialized work settings; such settings frequently result in conflict between professional and organizational norms (Hall, 1968). Thus, professionalization could affect technology-structure relationships by limiting the alternative structural arrangements in highly professionalized organizations. Under conditions of low professionalization, organization designers may be more sensitive to factors such as technological characteristics. Thus,

Hypothesis 3: Routineness is more positively related to centralization, formalization, and specialization in organizations with a low degree of professionalization.

Industrial sector: Manufacturing versus service. Manufacturing organizations may exhibit more positive technology-structure relationships than service organizations for two reasons. One is that service organizations, unlike manufacturing organizations, require adept information processing coupled with intense interactions between service providers and consumers (Mills & Moberg, 1982; Snyder, Cox, & Jesse, 1982). At the point of contact between the two, consumers introduce variability in the work flow (Snyder et al., 1982), and "client-created uncertainties" (Mills & Moberg, 1982: 474) limit the range of routineness. Further, such interactions may require service organizations to be designed in such a way that service providers have flexibility in dealing with their different consumers; such organizations need to be designed less mechanistically than others, regardless of other organizational characteristics. The requirement for low levels of centralization, formalization, and specialization restricts the range of structural characteristics. Thus, service organizations are likely to exhibit range restriction in both technology and structure variables when studied, leading to weaker, less positive technology-structure relationships. Range restrictions for both technology and structure are likely to be strongest among service organizations in which customization is high. In such a context, intense interactions with clients are especially likely to occur.

The second reason is that service organizations frequently include clients as "partial employees" (Mills & Morris, 1986). For example, retail shoppers select and transport purchases to the front counter, clients of law firms often prepare drafts of answers to judicial inquiries, and bank customers document their transactions subject to verification. These clients "are performing complex activities in the rendering of their own services" (Mills & Morris, 1986: 729). Because clients are difficult to control through centralization, formalization, and specialization, organizational units with many clients as partial employees are less likely to adopt very high levels of these structural characteristics. Technology-structure relationships are likely to be weaker in service organizations than in others as a result of this range restriction on centralization, formalization, and specialization. Thus,

Hypothesis 4: Routineness is more positively related to centralization, formalization, and specialization in manufacturing organizations than in service organizations.

Methods Variables

The research methods used may affect the results of any empirical study, but the effects of methods variables are rarely known and are discussed only occasionally in critical reviews or apologetic conclusion sections. Even less frequently do researchers specify the expected effects of methods variables in the theory-building process (Bagozzi & Phillips, 1982). One advantage of our meta-analytic approach is the ability to control for hypothesized methodological differences among studies while testing for multiple contingency variables. This ability reduces the possibility that the use of particular research methods will spuriously inflate or deflate the effects of variables suggested by a substantive theory. Thus, we developed hypotheses about the effects of three methods variables on the focal technology-structure relationships.

Industrial sector heterogeneity. Some researchers have used both manufacturing and service organizations, and others have used organizations from only one industrial sector. Samples of organizations from a single sector are less heterogeneous than samples from both industrial sectors. Such low heterogeneity restricts the variance on the technology and structure variables, leading to weaker relationships. More heterogeneity among the organizations in a study translates into truer variation and greater covariation among the technology and structure variables. Thus,

Hypothesis 5: Observed correlations between routineness and centralization, formalization, and specialization are more positive when industrial sector heterogeneity is high.

Note that Hypothesis 5 posits that range restriction of technology and structure variables within both the service and the manufacturing sectors results in weaker technology-structure relationships when a single sector is studied. One of the arguments supporting Hypothesis 4, however, is that range restriction occurs only within the service sector. Thus, to avoid confounding these effects, it was important to control for the effects posited in Hypothesis 5 when testing Hypothesis 4.

Average size of the units of analysis. Technology-structure relationships have been examined with industries, organizations, organizational subunits, and individuals as the units of analysis (Fry, 1982; Gerwin, 1981; Reimann & Inzerilli, 1981). The appropriateness of different units of analysis, however, depends on what the units of analysis are in the theory guiding the research (Glick & Roberts, 1984; Roberts, Hulin, & Rousseau, 1978). Because technology and structure concepts have been developed in the context of organizations and organizational subunits (Comstock & Scott, 1977; Gerwin, 1979; Perrow, 1967; Reimann, 1980; Thompson, 1967), the appropriate unit of analysis here appeared to be either the organization or the subunit. Thus, we excluded industries and individuals and limited the units of analysis in our models and research to organizations and subunits.

Despite narrowing the population studied to organizations and sub-

units, we still expected differences between those two units of analysis to lead to inconsistent results across studies with different units of analysis (Fry, 1982; Gerwin, 1979). The main theoretical rationale for these inconsistencies is that large units are more likely to contain components that vary in their levels of routineness, centralization, formalization, and specialization. Given this heterogeneity within large units, observed technology-structure correlations are likely to be weaker in studies of large units than in studies of smaller ones (Fry, 1982). A second argument for expecting weaker relationships in studies of large units is that data collected from a large unit may be less accurate than data collected from a smaller unit. In large units, the assessment of technology and structure variables requires a high level of abstraction. The people recording archival data, the key informants, or the questionnaire respondents must make abstract evaluations about the overall unit's technology or structure when they may not be knowledgeable about large sections of the unit (Seidler, 1974).

Although previous reviewers (Fry, 1982; Gerwin, 1979) have presented these arguments in terms of units of analysis and discrete classifications such as work group, department, division, and organization, the arguments are based on a more continuous conceptualization of unit size. Thus,

Hypothesis 6: Observed correlations between routineness and centralization, formalization, and specialization are more positive when the average size of the units of analysis is small.

Note that Hypothesis 2 posits organization size as the contingency variable, and Hypothesis 6 posits unit size. Although these contingency variables may be empirically correlated, the arguments supporting each hypothesis are different. Hypothesis 6 argues that regardless of whether a unit is an autonomous firm or an agency of the federal government, increased unit size is associated with increased internal diversity and increased abstraction in assessing technology and structure variables. Hypothesis 2, however, argues that the organizational context of the unit matters. Increased organization size has structural implications that affect the technology-structure relationships. Despite these differences in the arguments, the empirical correlation between unit size and organization size suggest that it is important to control for unit size before testing for organization size because unit size is less theoretically interesting and may confound the organization size effects.

Similarity of data sources. The third way that these studies varied was in their sources of data. Some researchers obtained both technological and structural data from institutional sources, and some obtained all data from survey sources. Other researchers obtained technological data from institutional sources and structural data from survey sources, or vice versa. Survey sources include interviews and questionnaires administered to a large percentage of organizational members. Institutional sources in technology-structure research have been limited to key informant interviews.

Use of different types of sources in a single study is expected to weaken observed technology-structure correlations for two reasons. First, each type

of source is associated with a different theoretical focus; institutional data tend to reflect the formal organization, but survey data emphasize the emergent and perceived organization (Pennings, 1973; Sathe, 1978). Second, when a study uses a single type of source, key informants' or questionnaire respondents' mental models of organizational relationships may artifactually inflate the true correlations; these mental models may encourage individuals to give researchers internally consistent data reflecting managers' beliefs that technology and structure are related (Ford & Hegarty, 1984). Both reasons support the following:

Hypothesis 7: Observed correlations between routineness and centralization, formalization, and specialization are more positive when technology and structure data are collected from similar sources.

METHODS

The combined set of hypotheses form more encompassing theoretical models of the three technology-structure relationships than previous models with single contingency variables represent. Each of the three models contains three sets of hypothesized determinants of the technology-structure relationships of interest: frequently cited contingency variables, newly proposed contingency variables, and methods contingency variables.

The theory-testing form of meta-analysis employed in this study is a significant advance over most meta-analyses in the organizational sciences that have used the Hunter, Schmidt, and Jackson (1982) technique.² The Hunter et al. technique is limited to testing individual hypotheses with t-tests and subsample analyses. A procedure that Hedges and Olkin (1985) developed, however, involves using multiple regression analysis to test sets of contingency hypotheses simultaneously while controlling for methods variables. Thus, this technique overcomes Guzzo, Jackson, and Katzell's (1987) criticism that traditional meta-analytic techniques are not well suited for dealing with multiple contingency variables.

Data

All available empirical studies that relate routineness to centralization, formalization, or specialization at an organization or subunit level of analysis provided data for this study. We identified 31 relevant empirical studies in the organization theory literature; 25 of these studies, containing 33 different samples, report quantified estimates of at least one of the three focal relationships. Relevant studies were identified through Fry's (1982) comprehensive review, the Social Science Citation Index, and our review of several organization theory journals.

² For exceptions, see Berlinger, Glick, and Rodgers (1988) and Huber, Miller, and Glick (1990).

Our conceptual work led us to exclude several studies cited in previous reviews of the focal technology-structure relationships (e.g., Fry, 1982; Gerwin, 1982). First, we excluded studies reporting analyses using only individuals (e.g., Billings, Klimoski, & Breaugh, 1977; Fullan, 1970; Sutton & Rousseau, 1979) or industries (Rushing, 1968) as their units of analysis. Our theory and most technology-structure researchers have emphasized organizations and organizational subunits as the appropriate units of analysis. Second, we excluded studies with definitions of technology not clearly related to the higher-order technology construct of routineness. We did not consider routineness to be reflected in "number of product changes" (Harvey, 1968; Keller, 1978; Keller, Slocum, & Susman, 1974), "the extent to which data processing machines were used in bookkeeping matters" (Blau & Schoenherr, 1971), "the extent to which computers were used in clerical matters" (Reimann, 1980), "number of products/services" (Dewar & Hage, 1978; Paulson, 1980), or "the rate of change in the technological environment" (Reimann, 1980). Third, we excluded studies with structure variables not clearly related to overall centralization, formalization, or specialization. Thus, studies with associated variables such as participation (e.g., Mohr, 1971) and studies focusing only on very narrow aspects of the focal structure variables (e.g., formalization of overtime rules) were excluded. Fourth, we excluded several studies (e.g., Aldrich, 1972) that used samples also used in other studies included in our data base because using those studies would have created unnecessary nonindependence in the data. Fifth, we excluded studies (Ayoubi, 1981; Negandhi & Reimann, 1973; Shenoy, 1981) that were conducted in less developed nations. We excluded those studies because organizational variables may exhibit different ranges in developed and less developed nations (Badran & Hinings, 1981; Zeffane, 1981), because relationships among organizational variables seem to be different in the two settings (Kim & Utterback, 1983; Zeffane, 1981), and because very few of the available studies have been conducted in less developed nations.³ Thus, our research applies only to developed, industrialized nations. Finally, we excluded one study because the researchers, Hinings and Lee (1971), purposely restricted the range of their technology variable in order to control for its effects. Studies included in our data base are listed in the references with asterisks.

Measures

Technology-structure correlations. If correlations with multiple indicators of one of the routineness definitions or multiple indicators of one of the structure variables were reported for a given sample, we combined the cor-

³ The three available studies were included, however, in supplemental empirical analyses. Data from these studies are available from the first author. Congruent with our reasoning, the error in our final regression models increased substantially and the regression models' parameters shifted when we added these three studies to the 31 primary studies. Lack-of-fit chi-square values indicated that none of these new models fit the data.

relations involving the multiple indicators into a composite score correlation (Hunter et al., 1982) and then "decorrected" these scores for measurement error to make them comparable to the other correlations.⁴ If a composite score correlation could not be computed, we averaged the correlations between the multiple indicators of the routineness and structure variables.

If correlations with more than one definition of routineness were reported for a given sample, the correlations were treated as having come from different samples. Although this approach creates some nonindependence among the observations, it makes the greatest use of the available data. It also appears less objectionable than either of the two alternatives: (1) arbitrarily choosing one of the correlations for inclusion in an analysis and eliminating the correlations associated with other routineness definitions or (2) averaging the correlations associated with the different routineness definitions, which would mask any effect of using one definition or another. This procedure yielded a total of 32 routineness-centralization correlations (2,351 underlying observations), 35 routineness-formalization correlations (2,376 underlying observations), and 27 routineness-specialization correlations (1,711 underlying observations) from the 33 samples.

Methods variables. *Industrial sector heterogeneity* was assessed by examining the percentage of each sample's units of analysis that were engaged in manufacturing. Samples with 50 percent of their units in manufacturing were the most heterogeneous and received a rating of 50. Other samples were rated by subtracting the absolute value of the difference between 50 percent and the percentage of units in manufacturing in a given sample from 50.

The average size of the units of analysis was assessed by examining the average number of employees in each sample's units of analysis. This value was reported for, or could be calculated for, 28 of the 33 samples. For the five remaining samples, we estimated the average size of the units of analysis with a four-step procedure. First, for all 33 samples, the unit of analysis was coded as organization or subunit. Second, the units of analysis were coded as large or small, with the threshold of 475 employees suggested by Miller and Toulouse (1986) as the criterion of largeness. Third, for the 28 samples that reported average numbers of employees, we calculated average unit size within each of four categories: large subunits, small subunits, large organizations, and small organizations. Fourth, the average size of the units of analysis for each of the five remaining samples was estimated with the appropriate average from step three.

Similarity of data sources was assessed by identifying the source of both technological and structural data for each sample. Similarity of data sources

⁴ Hunter and colleagues' (1982: 120) formula for combining correlations among multiple indicators into composite score correlations corrects for attenuation. To decorrect for attenuation—that is, to undo the correction for attenuation—we computed the interitem reliability (Cronbach's standardized α) among the multiple indicators of the structure or technology variable. Then, reversing the equation for correcting for attenuation (Hunter et al., 1982: 111), we multiplied the composite score correlation by the square root of the interitem reliability.

was coded as high (a value of 1) if information concerning both variables was collected from either institutional or survey sources. Similarity was coded as low (0) if information concerning technological and structural characteristics was collected from different types of sources.

Frequently cited contingency variables. Following Fry (1982), we assessed *definition of routineness* by examining the researchers' definitions of routineness and their citations to the scholars who originally developed the different routineness definitions. Citations to other technology-structure researchers were also considered. We also used variable labels, but these were misleading in several cases. Three dummy-coded variables were created to reflect whether a given correlation involved work flow integration, routinization, or production continuity, with each dummy variable coded as 1 if yes, 0 if no. This dummy coding implies that the variables will be negatively correlated and definitionally dependent. We assessed *organizational size* by examining the average number of employees in the organizations used in each sample; to be consistent with the existing technology-structure literature, we did not count employees of parent organizations, if they existed. This value was reported for, or could be calculated for, 25 of the 33 samples. Using descriptions of the organizations contained in the published studies, the remaining eight samples were coded as large or small, with coding again based on the 475-employee threshold. Organizational size estimates were then calculated using the procedure described earlier to calculate the average size of the units of analysis. It should be noted that for samples consisting of subunits, organizational size equaled the average size of the organizations that housed the subunits. For samples consisting of organizations, organizational size equaled the average size of the units of analysis.

Proposed contingency variables. We assessed *professionalization* by estimating the percentage of each sample's units of analysis that were staffed predominantly by professionals, people whose roles required years of formal training. The variable was coded into five categories: 0, 25, 50, 75, and 100 percent. For example, a sample of only nursing subunits (Leatt & Schneck, 1982) was coded as 100 percent for professionalization. *Industrial sector* was assessed by examining the percent of each sample's units of analysis that were manufacturing organizations or subunits. The resulting variable was labeled "percentage of units in manufacturing."

Two raters independently coded data for all variables to enhance reliability and validity (Miller & Carlson, 1990). (All coded data are available from the first author.) Table 1 reports interrater reliabilities, sample size-weighted means, and sample size-weighted correlations among the variables. Except for similarity of data sources, all interrater reliabilities are very high, ranging from .92 to 1.00. Although there were only 3 disagreements out of 94 judgments, the interrater reliabilities for similarity of data sources ranged from a -.02 to .84 because variances were limited: very few studies reported dissimilar data sources. The coders resolved all coding disagreements through discussion. It should be noted that the signs of the original technology-structure correlations were coded to be consistent with our def-

TABLE 1
Interrater Reliabilities, Sample Size-Weighted Means, and Sample Size-Weighted Correlations^{a,b}

Variables	Interrater Reliabilities ^c	Mean ^d	1	2	3	4	5	6a	6b	7a	7b	7c	8	9
1. Routineness-centralization correlations	1.00	0.08												
2. Routineness-formalization correlations	1.00	0.26												
3. Routineness-specialization correlations	1.00	0.03												
4. Industrial sector heterogeneity	NA	9.34												
5. Average size of units of analysis	1.00	601.89												
6. Similarity of data sources														
a. Routineness-centralization	-0.02	0.99												
b. Routineness-formalization	0.84	0.83												
c. Routineness-specialization	0.65	0.58												
7. Definition of routineness														
a. Use of work flow														
Integration	0.95	0.26												
b. Use of routinization	1.00	0.50												
c. Use of production continuity	0.95	0.24												
8. Organizational size	1.00	1,172.63												
9. Professionalization	0.92	13.13												
10. Percentage of units in manufacturing	0.99	44.12												

^a Note that variables 1, 2, and 3 are themselves correlations. Thus, for example, the positive correlation of .68 between the average size of the units of analysis and the routineness-specialization correlations means that the larger the units of analysis in a sample, the higher the numerical value of the correlation between routineness and specialization. A higher numerical value does not necessarily indicate a stronger correlation (i.e., relative to -.40, -.10 is a higher numerical value, but is a weaker correlation).

^b Significance levels for correlations between the potential sources of methods variance, the commonly accepted contingency variables, the proposed contingency variables, and technology-structure correlations (columns 1-3) were found using simple regression analyses (Hedges & Olkin, 1985). Significance levels for the remaining correlations (columns 3-6) were found in the traditional manner, using pairwise deletion of missing data; $N = 40$ for variables 4, 5, 7a-10; $N = 32$ for variable 6a; $N = 35$ for variable 6b; and $N = 27$ for variable 6c.

^c Intraclass correlations (ICC 2,k, Shrout & Fleiss, 1979) were used as the reliability coefficients for variables on continuous scales. Kappa (Cohen, 1968) was used for the categorical variables.

^d There are 32 routineness-centralization correlations (2,351 underlying observations), 35 routineness-formalization correlations (2,376 underlying observations), and 27 routineness-specialization correlations (1,711 underlying observations).

* $p < .05$

** $p < .01$

*** $p < .001$

initions of technology and structure variables; for instance, the coders reverse-scored correlations based on decentralization.

Analysis

Both narrative literature reviews and meta-analyses start with a thorough review of the relevant empirical and theoretical literatures. They diverge at the analysis stage. Researchers conducting narrative literature analyses summarize knowledge about a field by cognitively aggregating the reported results after discounting the results of purportedly weak studies. Although this approach has advantages in developing hypotheses (Guzzo et al., 1987), narrative literature analyses are not generally regarded as acceptable for testing hypotheses. Hypothesis testing is accomplished more appropriately with meta-analysis. The quantitative nature of meta-analysis enhances reliability, reduces the cognitive complexity required by the aggregation task, and forces researchers to be more explicit about their underlying assumptions. Rather than ignoring purportedly weak studies, meta-analysts attempt to include all relevant studies and empirically test whether specific study attributes influenced results. Empirically testing for potential confounds, such as the methods variables in Hypotheses 5, 6, and 7, guards against the criticism of "garbage in and garbage out" (Wachter, 1988: 1407) and enhances understanding of underlying relationships after the confounds have been controlled. As a result of these advantages, meta-analysis has been strongly recommended to researchers conducting literature analyses (Glass, McGaw, & Smith, 1981; Hedges & Olkin, 1985; Hunter et al., 1982), especially in the context of technology-structure research (Hirst, 1984).

The meta-analysis used here involved four steps. First, we compiled information concerning the variables, as in a traditional literature review. Second, three sample size-weighted mean correlations were calculated: one for the set of 32 routineness-centralization correlations, one for the set of 35 routineness-formalization correlations, and one for the set of 27 routineness-specialization correlations. Each of these mean correlations was also tested statistically to determine whether it was significantly different from zero (Hedges & Olkin, 1985; Hunter et al., 1982). Third, we tested the sufficiency of sampling error as an explanation of the observed variation in each of the three sets of correlations. If sampling error—that is, error due to small sample sizes—accounts for most of the variation across a set of correlations, hypothesized contingency variables should not be investigated (Hedges & Olkin, 1985; Hunter et al., 1982).

The fourth step involved testing the hypotheses developed earlier as explanations of the variation in the three technology-structure relationships. Given the probable intercorrelations among the contingency and methods variables, we tested the hypotheses with a series of regression analyses, weighted by sample size (Hedges & Olkin, 1985). The routineness-centralization, routineness-formalization, and routineness-specialization correlations were regressed on the methods and contingency variables identified in the hypotheses. We adopted the conservative approach of entering

methods variables in all regression analyses to prevent spurious conclusions about the variables of greater theoretical interest. Because a large number of independent samples and observations underlie each set of correlations, the statistical power of the meta-analyses for detecting true effects is quite high. For example, if a contingency variable causes a true correlation to vary by as much as .3, the probabilities of detecting this variation are .86, .88, and .75, for routineness-centralization, routineness-formalization, and routineness-specialization, respectively ($p = .05$) (Sackett, Harris, & Orr, 1986; Spector & Levine, 1987).

RESULTS

The sample size-weighted means of the 32 routineness-centralization correlations, the 35 routineness-formalization correlations, and the 27 routineness-specialization correlations are .08 ($p < .001$), .26 ($p < .001$), and .03 (n.s.), respectively (see Table 1). Thus, the results support three conclusions: (1) routineness is positively related to centralization, (2) routineness is positively related to formalization, and (3) routineness is not related to specialization. These conclusions are, however, too simple to be accurate. They do not account for the variance reported in the literature: routineness centralization correlations ranged from $-.28$ to $.55$, routineness-formalization correlations ranged from $-.27$ to $.81$, and routineness-specialization correlations ranged from $-.24$ to $.48$. Both the Hedges and Olkin (1985) and Hunter et al. (1982) meta-analytic chi-square tests rule out the possibility that the variation in any of the three sets of correlations is solely due to sampling error ($p < .001$); less than 12 percent of the variation in each of the three sets of observed correlations can be attributed to sampling error, suggesting that the variation within each of the three sets of correlations is a consequence of methods variables or contingency variables such as those discussed above. Thus, the initial meta-analytic procedures confirmed the need for more encompassing theoretical models.

Methods Variables

Three complications were encountered when estimating the effects of the methods variables reflected in Hypotheses 5, 6, and 7. First, only Shrader (1989) collected routineness and centralization data from dissimilar sources. Thus, extraneous, unspecified characteristics of that study completely confound the effect of similarity of data sources on routineness-centralization correlations. A second, but less severe problem was that routineness and specialization data were collected from dissimilar sources in only two available studies (Drazin & Van de Ven, 1985; Fry & Slocum, 1984). Consequently, in the set of routineness-specialization correlations, the effects of similarity of data sources may be confounded with unmeasured characteristics unique to those two studies. These potentially confounded results limit the generalizability of our findings concerning similarity of data sources. Third, both industrial sector heterogeneity and the average size of the units of analysis

are correlated with some of the other contingency variables (see Table 1). Thus, the effects of these methods variables may also confound or be confounded by effects of other contingency variables.

The effects of the methods variables were tested by regressing the technology-structure correlations on the three methods variables. The methods variables predict 51 percent of the variance among the 32 routineness-centralization correlations and 11 percent of the variance in the 35 routineness-formalization correlations (see Table 2). For these two sets of technology-structure correlations, Hypothesis 6 receives mixed support; observed correlations between routineness and centralization are more positive when the average size of the units of analysis is small rather than large. The average size of the units of analysis, however, is unrelated to the routineness-formalization correlations. Findings did not support Hypotheses 5 and 7: studies of organizations in a single industrial sector report more, rather than less, positive correlations than studies with industrial sector heterogeneity, and similarity of data sources has no effect on routineness-formalization correlations. Because of the complete confounding of similarity of data sources with the Shrader (1989) study noted above, we did not examine similarity of data sources for the routineness-centralization relationship.

The methods variables predict 50 percent of the variance among the 27 routineness-specialization correlations. Findings did not support any of the methods hypotheses, however: the larger the average size of the units of analysis, the more positive the observed routineness-specialization correla-

TABLE 2
Technology-Structure Correlations Regressed on Methods Variables^a

Variables	Routineness-Centralization ^b	Routineness-Formalization ^c	Routineness-Specialization ^d
Industrial sector heterogeneity	-.00545*** (.00138)	-.00722*** (.00163)	.00280 (.00189)
Average size of units of analysis	-.00007* (.00003)	-.00005 (.00003)	.00011*** (.00003)
Similarity of data sources		.09786 (.05894)	.08142 (.08407)
Intercept	.17780	.24994	-.10264
Multiple R	.73***	.44***	.75***
Adjusted R ²	.51***	.11***	.50***

^a Table entries are unstandardized regression coefficients; standard errors, adjusted following Hedges and Olkin (1985), are in parentheses.

^b Thirty-two correlations from a combined observation pool of 2,351 were being predicted.

^c Thirty-five correlations from a combined observation pool of 2,376 were being predicted.

^d Twenty-seven correlations from a combined observation pool of 1,711 were being predicted.

* $p < .05$

** $p < .01$

*** $p < .001$

tions, whereas the routineness-specialization correlations are not uniquely related to either industrial sector heterogeneity or the similarity of data sources.

Frequently Cited Contingency Variables

Hypotheses 1 and 2 were tested by controlling for methods effects and regressing the technology-structure correlations on the definition of routineness (represented by two dummy variables) and organizational size. As shown in Table 3, Hypothesis 1 is supported, but Hypothesis 2 is not. Given the statistical power of our analysis, the nonsignificant effects of the definitions of routineness support the hypothesis that the use of different definitions of routineness has a negligible effect on technology-structure correlations. All three definitions appear to reflect a single underlying routineness construct. The sole statistically significant effect for these frequently cited variables contradicts Hypothesis 2: routineness-formalization correlations are more positive in studies of large organizations than in studies of small ones.

TABLE 3
Technology-Structure Correlations Regressed on Methods Variables and
Frequently Cited Contingency Variables^a

Variables	Routineness-Centralization ^b	Routineness-Formalization ^c	Routineness-Specialization ^d
Industrial sector heterogeneity	-.00517*** (.00144)	-.00523** (.00175)	.00347 (.00194)
Average size of units of analysis	-.00010 (.00007)	-.00013* (.00007)	.00333 (.00200)
Similarity of data sources		.19852** (.06144)	-4.00904 (2.69662)
Definition of routineness			
Use of work flow integration	-.00372 (.09372)	-.06194 (.09616)	-.27970 (.16948)
Use of production continuity	.00143 (.09214)	-.14036 (.09288)	-.23337 (.16892)
Organizational size	.00005 (.00006)	.00017** (.00006)	-.00321 (.00200)
Intercept	.13823	.03381	4.21809
Multiple R	.75***	.67***	.80***
Adjusted R ²	.47***	.33***	.54***

^a Table entries are unstandardized regression coefficients; standard errors, adjusted following Hedges and Olkin (1985), are in parentheses.

^b Thirty-two correlations from a combined observation pool of 2,351 were being predicted.

^c Thirty-five correlations from a combined observation pool of 2,376 were being predicted.

^d Twenty-seven correlations from a combined observation pool of 1,711 were being predicted.

* $p < .05$

** $p < .01$

*** $p < .001$

Proposed Contingency Variables

In Hypotheses 3 and 4, professionalization of the work force and industrial sector (percentage of units in manufacturing) were proposed as possible determinants of technology-structure relationships. As shown in Table 4, professionalization and industrial sector do not appear to affect routineness-centralization or routineness-specialization correlations after the contribution of the methods variables has been allowed for. However, the two proposed contingency variables appear to affect routineness-formalization correlations: more positive routineness-formalization correlations are found in less professionalized organizations and subunits (as set forth in Hypothesis 3), and more positive routineness-formalization correlations are found in service organizations and subunits (counter to Hypothesis 4). Further, inclusion of these two variables increases the proportion of variance predicted to .41 from the .11 predicted by the routineness-formalization regression model that included only the methods variables (Table 2).

Developing Parsimonious Models

At this point in the analysis, it was clear that a different set of variables affected each of the three focal technology-structure relationships. Further,

TABLE 4
Technology-Structure Correlations Regressed on Methods Variables and Proposed Contingency Variables^a

Variables	Routineness-Centralization ^b	Routineness-Formalization ^c	Routineness-Specialization ^d
Industrial sector heterogeneity	-.00549*** (.00138)	-.00608*** (.00165)	.00125 (.00311)
Average size of units of analysis	-.00006 (.00004)	.00003 (.00003)	.00011*** (.00003)
Similarity of data sources		.05890 (.06604)	.23933 (.31912)
Professionalization	-.00079 (.00072)	-.00367*** (.00075)	.00111 (.00416)
Percentage of units in manufacturing	-.00054 (.00065)	-.00317*** (.00064)	-.00181 (.00324)
Intercept	.20770	.41156	-.10269
Multiple R	.75***	.70***	.77***
Adjusted R ²	.50***	.41***	.50***

^a Table entries are unstandardized regression coefficients; standard errors, adjusted following Hedges and Olkin (1985), are in parentheses.

^b Thirty-two correlations from a combined observation pool of 2,351 were being predicted.

^c Thirty-five correlations from a combined observation pool of 2,376 were being predicted.

^d Twenty-seven correlations from a combined observation pool of 1,711 were being predicted.

* $p < .05$

** $p < .01$

*** $p < .001$

several of the variables did not have the expected effects. Thus, to develop three separate yet parsimonious models, we adopted a theory-trimming procedure (Duncan, 1975; Heise, 1969). Each contingency variable was iteratively added and replaced in a stepwise regression procedure (SAS Institute, 1985) to develop a parsimonious model for each of the three technology-structure relationships. The stepwise procedure was stopped when the value of the chi square indicating the incremental predictiveness of a model was not significant at the .05 level (Hedges & Olkin, 1985). Table 5 reports the results of the theory-trimming procedure.

Two methods variables, industrial sector heterogeneity and average size of the units of analysis, compose both the routineness-centralization (adjusted $R^2 = .51$, $p < .001$) and the routineness-specialization (adjusted $R^2 = .49$, $p < .001$) parsimonious models. However, the directionality of the variables differs across the two models: more positive routineness-centralization

TABLE 5
Trimmed Models: Technology-Structure Correlations Regressed on
Methods Variables, Frequently Cited Contingency Variables, and
Proposed Contingency Variables^a

Variables	Routineness-Centralization ^b	Routineness-Formalization ^c	Routineness-Specialization ^d
Industrial sector heterogeneity	-.00545*** (.00138)	-.00488** (.00174)	.00368* (.00178)
Average size of units of analysis	-.00007* (.00003)		.00013*** (.00003)
Similarity of data sources			
Definition of routineness			
Use of work flow integration		-.22284*** (.05736)	
Use of production continuity		-.32661*** (.05997)	
Organizational size			
Professionalization		-.00384*** (.00069)	
Percentage of units in manufacturing			
Intercept	.17780	.45580	-.07379
Multiple R	.73***	.73***	.73***
Adjusted R ²	.51***	.47***	.49***
Lack-of-fit χ^2	31.11	63.27***	28.43

^a Table entries are unstandardized regression coefficients; standard errors, adjusted following Hedges and Olkin (1985), are in parentheses.

^b Thirty-two correlations from a combined observation pool of 2,351 were being predicted.

^c Thirty-five correlations from a combined observation pool of 2,376 were being predicted.

^d Twenty-seven correlations from a combined observation pool of 1,711 were being predicted.

* $p < .05$

** $p < .01$

*** $p < .001$

correlations emerge within one industrial sector and with small units of analysis, and more positive routineness-specialization correlations emerge with large units of analysis drawn from both industrial sectors. Results of chi-square lack-of-fit tests (Hedges & Olkin, 1985) indicate that the parsimonious models for routineness-centralization and routineness-specialization fit the data extremely well ($p > .36$ and $.24$).

Industrial sector heterogeneity, professionalization, and the use of either the work flow integration or production continuity definition of routineness (rather than the routinization definition) are included in the routineness-formalization parsimonious model (adjusted $R^2 = .47$, $p < .001$). Routineness and formalization are more positively associated among less professionalized organizations drawn from a single industrial sector (service or manufacturing) when the routinization definition of routineness is used. The chi-square lack-of-fit test, however, indicates that this regression model does not fit the data very well ($p < .001$). Additional variables are required to explain the variation in the 35 routineness-formalization correlations.⁵

DISCUSSION

Two main purposes of this study were to use cumulative data from technology-structure research to develop and test theoretical models of three technology-structure relationships. The final results, shown in Table 5, suggest three different models: (1) the observed association between routineness and centralization, $f(\text{routineness, centralization})$, depends on the industrial sector heterogeneity of the sets of units being studied and on the average size of the units of analysis; (2) the observed association between routineness and formalization, $f(\text{routineness, formalization})$, depends on the industrial sector heterogeneity of the set of units being studied, on the definition of routineness assessed, and on the professionalization of the work force; and (3) the observed association between routineness and specialization, $f(\text{routineness, specialization})$, depends on the industrial sector heterogeneity of the set of units being studied and on the average size of the units of analysis.

Thus, one result of this study is three models: (1) $f_1(\text{routineness, centralization}) = g_1$ (industrial sector heterogeneity, average size of the units of analysis); (2) $f_2(\text{routineness, formalization}) = g_2$ (industrial sector heterogeneity, definition of routineness, professionalization); and (3) $f_3(\text{routineness, specialization}) = g_3$ (industrial sector heterogeneity, average

⁵ We used supplemental, post hoc analyses to test the efficacy of alternative, more commonly accepted conceptualizations for the average size of the units of analysis and similarity of data sources variables. As noted earlier, previous reviews have emphasized units of analysis rather than the average size of the units of analysis (Fry, 1982; Gerwin, 1981; Reimann & Inzerilli, 1981) and sources of data (institutional versus survey) rather than similarity of sources of data (Pennings, 1973; Sathé, 1978). Neither of these alternative conceptualizations of methods variables improved any of the adjusted R^2 or lack-of-fit chi squares in the trimmed regression models.

size of the units of analysis). The percentages of variation in the technology-structure relationships predicted by the linear functions of the contingency variables are .51, .47, and .49 for f_1 - g_1 (routineness-centralization), f_2 - g_2 (routineness-formalization), and f_3 - g_3 (routineness-specialization), respectively. Further, the lack-of-fit statistics for the routineness-centralization and routineness-specialization models ($p > .36$ and $p > .24$) increase our confidence that these linear approximations fit the data very well. Compared to the results of most organizational research, these results are remarkably strong.

Implications for Organization Theory

These empirical results indicate that the three technology-structure relationships vary considerably and that contingency variables affect the variation of each relationship. The form of theory building adopted in this study focused on explaining variations in the relationships rather than variation in a single dependent variable. There are no a priori reasons, however, to expect the predicted effects to be any stronger or weaker than those typically observed in organizational research. Thus, the remarkably strong observed effects suggest that this form of theory building and testing is a promising avenue for understanding relationships among organizational variables. Thus, it should be pursued parallel to existing approaches.

The set of contingency variables that we labeled methods variables most accurately predicted the confusing and contradictory findings in the technology-structure literature. More specifically, industrial sector heterogeneity and the average size of the units of analysis predict the technology-structure correlations in the intermediate analyses (see Tables 1 to 4) and in the final analyses (see Table 5). Theoretical models developed for large organizational units are not entirely valid for understanding small units, and models developed within industrial sectors appear not to be valid across sectors. Thus, these methods variables should be incorporated explicitly into any model of a technology-structure relationship as boundary conditions or as specific moderators of the focal relationship. In addition to enriching the technology-structure theory, explicit incorporation of methods variables into technology-structure theories will lead empirical researchers to measure and control for the size of the units of analysis and industrial sector heterogeneity.

The frequently cited contingency variables are not as predictive of variations in the technology-structure relationships as the methods variables. Neither organizational size nor use of one definition of routineness versus another affects the routineness-centralization or the routineness-specialization correlations. The routineness-formalization relationship, however, does vary as a function of these frequently cited contingency variables. In the initial regression results (Table 3), small organizations exhibit more positive routineness-formalization relationships. In the final analyses, however, this effect is replaced with effects that are due to professionalization and the definition of routineness; less positive routineness-formalization relationships emerge when the work flow integration or the production continuity definition of routineness is used. Thus, with the ex-

ception of the findings on the routineness-formalization relationship, the current findings are counter to frequently cited arguments.

A final implication of the present results is that performance is unlikely to have strong effects on either the routineness-centralization or the routineness-specialization relationship. This implication is supported by the small, nonsignificant lack-of-fit chi squares (Hedges & Olkin, 1985) for the trimmed regression models in the absence of a measure of performance in the models, the large amount of variance predicted by industrial sector heterogeneity and the average size of the units of analysis, and the likelihood that these two methods variables are unrelated to performance. Given adequate statistical power in our analyses, "arguments about bias due to model misspecification are unlikely to be credible" (Hedges & Olkin, 1985: 172). In other words, omission of performance and other variables from our models of the routineness-centralization and routineness-specialization relationships does not appear to bias our results. Thus, although we were not able to test the role of performance directly, its effects are probably limited for the routineness-centralization and routineness-specialization relationships.

Despite our use of cumulative data from three decades of technology-structure research, two cautionary notes are in order. First, some of the methods and contingency variables were highly correlated, as Table 1 shows. The consequent multicollinearity reduces the stability of multiple regression estimates, as some of the minor shifts between the results of the initial regression analyses (Tables 2 to 4) and the results of the final trimmed regressions illustrate (Table 5). The multicollinearity also reduces the generalizability of the results. The main source of the multicollinearity appears to be a lack of variation in research designs resulting from the existence of two dominant research approaches in the technology-structure literature. The first is the Aston approach (e.g., Hickson et al., 1974), which is focused on work flow integration and production continuity and relies on the organization as the unit of analysis and on institutional measures. Of the 25 studies in our analysis, 15 followed this model completely, with 11 of these studies using the same measures as Hickson and colleagues. Studies following the Aston approach are also similar in their focus on large manufacturing organizations. The second dominant research approach, established by Hage and Aiken (1969), is focused on routinization in small, service sector units. All of the 10 non-Aston studies followed the Hage and Aiken (1969) approach completely, with one partial exception that included some manufacturing units.⁶ This focus on two patterns reduces the requisite variety in

⁶ In post hoc analyses, we tested the hypothesis that both of these dominant research approaches represented attempts to develop limited domain theories that should not be integrated. All correlations were coded as reflecting the Aston research approach or the Hage and Aiken approach. When tested alone, this research approach contrast had a strong significant effect on all three technology-structure relationships. When it was entered in stepwise regressions with previous contingency variables, however, the research approach contrasts were nonsignificant.

research designs and limits the generalizability of our findings. Thus, given the possible instability and limited generalizability of these results, future researchers should continue to discuss and report information about methods and potential contingency variables that are not significant in our final results.

A second cautionary note concerns the ecological fallacy (Glick & Roberts, 1984; Mossholder & Bedian, 1983). Many of our theoretical arguments are focused on organizations, but our measures of the methods and contingency variables are based on characteristics of samples. Thus, we committed unavoidable ecological fallacies in testing the effects of variables that may vary both within and between samples, such as organizational size, professionalization, the size of the units of analysis, and performance. The effect of these ecological fallacies is underestimation (or overestimation) of the effects of methods and contingency variables that are more (or less) strongly related to the technology-structure relationships within rather than between samples. Without access to all of the original data, we cannot be positive whether our analyses have overestimated, underestimated, or accurately estimated the true strength of the effects of these methods and contingency variables (Glick & Roberts, 1984). Given, however, that the potential bias depends on the relative strength of within-sample versus between-sample effects, and given the lack of an obvious argument supporting either overestimation or underestimation, we do not believe that any ecological fallacies strongly bias our results.

Implications for Each Relationship

A clear pattern throughout the results is that each technology-structure relationship depends on a different set of contingency effects. None of the tested contingency variables has a consistent positive or negative effect across all three of the final models, and only one variable, industrial sector heterogeneity, enters all three of the final models. Thus, explanations of the factors that affect the technology-structure relationships must be focused on the specific relationships.

Routineness-centralization. Among small units of analysis in a single industrial sector, the routineness-centralization relationship is moderately positive, but among large units of analysis from both industrial sectors, the relationship is actually negative. For example, the regression coefficients of Table 5 can be used to calculate an expected correlation of .18 between routineness and centralization for a study of sample units averaging 12 employees and drawn from either manufacturing or service sectors, but not both industrial sectors. In a heterogeneous set of larger units averaging 1,000 employees, this point estimate drops to $-.17$. This pattern of results supports the hypothesized negative effect of increasing unit size on the routineness-centralization relationship. In larger units, increased routineness may facilitate decentralization by improving the effectiveness of alternative control mechanisms such as formalization and standardization. In smaller units, however, increased routineness reduces the number of exceptions requiring

hierarchical referral, thereby allowing top administrators to centralize control through direct involvement in decision making.

Routineness-formalization. The routineness-formalization relationship is the most consistently and strongly positive of the three technology-structure relationships. Among nonprofessionalized units in a single industrial sector when the routinization definition of routineness is used, the predicted routineness-formalization correlation is .43. In a professionalized, heterogeneous sample of manufacturing and service sector units, the correlation reverses and drops to $-.11$ when the production continuity definition of routineness is used. The effect of industrial heterogeneity supports Mills and Moberg's (1982) argument against sampling organizations from both sectors because no measure of routineness or structure is likely to capture the same processes in both service and manufacturing organizations.

The results also support frequent assertions that the mixed technology-structure results are due to the use of different definitions of routineness (Ford & Slocum, 1977; Fry, 1982; Gerwin, 1979, 1981; Reimann & Inzerilli, 1981; Withey et al., 1983). Formalization is more strongly associated with routinization than with work flow integration or production continuity. These results, however, only occur with the routineness-formalization relationship, rather than with all three relationships.

More positive routineness-formalization relationships were observed in less professionalized organizations, supporting the arguments for Hypothesis 3 that professionalization and formalization are alternative forms of control and professional norms are incompatible with the constraints formalization imposes.

Routineness-specialization. Of the three relationships, the routineness-specialization relationship is the most highly contingent on the methods variables. On the average, this relationship is not significantly different from zero, but in heterogeneous samples of units averaging 1,000 employees, the estimated routineness-specialization correlation is .24. In a homogeneous sample of small units averaging 12 employees, the predicted correlation is $-.07$. As Hypothesis 5 suggests, the routineness-specialization relationship is stronger with high industrial sector heterogeneity in a sample. However, the strong positive effect of unit size on the routineness-specialization relationship negated Hypothesis 6. A simple explanation for this effect is that small units have less opportunity to specialize than large units.⁷

CONCLUSIONS

This study demonstrates clearly the utility of focusing theory-building efforts on explaining variations in a relationship rather than variation in a single dependent variable. In addition to our theory building, we used a multivariate form of meta-analysis to test simultaneously multiple explana-

⁷ We gratefully acknowledge the suggestion of this explanation from one of the anonymous reviewers.

tions of variations in technology-structure relationships. Contrary to expectations, we found that variations in technology-structure relationships seem to be explained most easily with methods variables. Thus, future researchers should consider carefully their research design decisions regarding industrial sector heterogeneity and the average size of the units of analysis. Further, practitioners should take account of these methods variables when generalizing technology-structure research to their particular cases. For example, the routineness-centralization model suggests that an organization designer in a small service operation would want to increase centralization of decision-making authority in the face of increasing routineness. To do so would be to follow the collective wisdom of hundreds of managers in ongoing organizations.

REFERENCES^a

- Aldrich, H. 1972. Technology and organization structure: A reexamination of the findings of the Aston group. *Administrative Science Quarterly*, 17: 26-43.
- * Alexander, J. W., & Randolph, W. A. 1985. The fit between technology and structure as a predictor of performance in nursing subunits. *Academy of Management Journal*, 28: 844-859.
- Ayoubi, Z. M. 1981. Technology, size and organization structure in a developing country: Jordan. In D. J. Hickson & C. J. McMillan (Eds.), *Organization and nation: The Aston programme IV*: 95-114. Hampshire, England: Gower Publishing Company.
- Badran, M., & Hinings, C. R. 1981. Strategies of administrative control and contextual constraints in a less developed country: The case of Egyptian public enterprise. In D. J. Hickson & C. J. McMillan (Eds.), *Organization and nation: The Aston programme IV*: 115-131. Hampshire, England: Gower Publishing Company.
- Bagozzi, R. P., & Phillips, L. W. 1982. Representing and testing organizational theories: A holistic construal. *Administrative Science Quarterly*, 27: 459-489.
- * Ballem, V. 1982. Technological routineness and intra-unit structure in CPA firms. *Accounting Review*, 57: 88-103.
- Barley, S. R. 1986. Technology as an occasion for structuring: Evidence from observations of CT scanners and the social order of radiology departments. *Administrative Science Quarterly*, 31: 78-108.
- Berlinger, L. R., Glick, W. H., & Rodgers, R. C. 1988. Job enrichment and performance improvement. In J. P. Campbell & R. J. Campbell (Eds.), *Productivity in organizations: New perspectives from industrial and organizational psychology*: 219-254. San Francisco: Jossey-Bass.
- Billings, R. S., Klimoski, R. J., & Breaugh, J. A. 1977. The impact of a change in technology on job characteristics: A quasi-experiment. *Administrative Science Quarterly*, 22: 318-339.
- * Blau, P. M., Falbe, C. M., McKinley, W., & Tracy, P. K. 1976. Technology and organization in manufacturing. *Administrative Science Quarterly*, 21: 20-40.
- Blau, P. M., & Schoenherr, R. A. 1971. *The structure of organizations*. New York: Basic Books.
- * Child, J. 1972. Organization structure and strategies of control: A replication of the Aston study. *Administrative Science Quarterly*, 17: 163-173.
- Child, J. 1976. Predicting and understanding organizational structure. In D. S. Pugh & C. R. Hinings (Eds.), *Organizational structure: Extensions and replications*: 45-64. Westmead, England: Saxon House.

- Child, J. 1984. *Organization: A guide to problems and practice*. London: Harper & Row.
- * Child, J., & Kieser, A. 1981. Organization and managerial roles in British and West German companies: An examination of the culture-free thesis. In D. J. Hickson & C. J. McMillan (Eds.), *Organization and nation: The Aston programme IV*: 51–73. Hampshire, England: Gower Publishing Company.
- * Child, J., & Mansfield, R. 1972. Technology, size, and organization structure. *Sociology*, 6: 369–393.
- Cohen, J. A. 1968. Weighted kappa: Nominal scale agreement with provision for scaled disagreement or partial credit. *Psychological Bulletin*, 70: 213–220.
- * Comstock, D. E., & Scott, W. R. 1977. Technology and the structure of subunits: Distinguishing individual and workgroup effects. *Administrative Science Quarterly*, 22: 177–202.
- Daft, R. L. 1986. *Organization theory and design* (2d ed.). St. Paul: West Publishing Company.
- * Dewar, R., & Hage, J. 1978. Size, technology, complexity, and structural differentiation: Toward a theoretical synthesis. *Administrative Science Quarterly*, 23: 111–136.
- * Dewar, R., & Werbel, J. 1979. Universalistic and contingency predictions of employee satisfaction and conflict. *Administrative Science Quarterly*, 24: 426–448.
- Donaldson, L. 1976. Woodward, technology, organizational structure and performance—A critique of the universal generalization. *Journal of Management Studies*, 13: 255–273.
- * Drazen, R., & Van de Ven, A. H. 1985. Alternative forms of fit in contingency theory. *Administrative Science Quarterly*, 30: 514–539.
- Duncan, O. D. 1975. *Introduction to structural equation models*. New York: Academic Press.
- Ford, J. D., & Hegarty, W. H. 1984. Decision makers' beliefs about the causes and effects of structure: An exploratory study. *Academy of Management Journal*, 27: 271–291.
- Ford, J. D., & Slocum, J. W., Jr. 1977. Size, technology, environment and the structure of organizations. *Academy of Management Review*, 2: 561–575.
- Fry, L. W. 1982. Technology-structure research: Three critical issues. *Academy of Management Journal*, 25: 532–552.
- * Fry, L. W., & Slocum, J. W., Jr. 1984. Technology, structure, and workgroup effectiveness: A test of a contingency model. *Academy of Management Journal*, 21: 221–246.
- Fullan, M. 1970. Industrial technology and worker integration in the organization. *American Sociological Review*, 35: 1028–1039.
- Galbraith, J. 1977. *Organization design*. Reading, MA: Addison-Wesley.
- Gerwin, D. 1979. The comparative analysis of structure and technology: A critical appraisal. *Academy of Management Journal*, 4: 41–51.
- Gerwin, D. 1981. Relationships between structure and technology. In P. Nystrom & W. Starbuck (Eds.), *Handbook of organization design*: 3–38. New York: Oxford University Press.
- Glass, G. V., McGaw, B., & Smith, M. L. 1981. *Meta-analysis in social research*. Beverly Hills, CA: Sage Publications.
- Glick, W. H., & Roberts, K. H. 1984. Hypothesized interdependence, assumed independence. *Academy of Management Review*, 9: 722–735.
- * Glisson, C. A. 1978. Dependence of technological routinization on structural variables in human service organizations. *Administrative Science Quarterly*, 23: 383–395.
- * Glisson, C. A., & Martin, P. Y. 1980. Productivity and efficiency in human service organizations as related to structure, size, and age. *Academy of Management Journal*, 23: 21–37.
- * Grinyer, P. H., & Yasai-Ardekani, M. 1980. Dimensions of organizational structure: A critical replication. *Academy of Management Journal*, 23: 405–421.

- Guzzo, R. A., Jackson, S. E., & Katzell, R. A. 1987. Meta-analysis analysis. In L. L. Cummings & B. M. Staw (Eds.), *Research in organizational behavior*, vol. 9: 407–442. Greenwich, CT: JAI Press.
- * Hage, J., & Aiken, M. 1969. Routine technology, social structure, and organizational goals. *Administrative Science Quarterly*, 14: 368–379.
- Hall, R. H. 1968. Professionalization and bureaucratization. *American Sociological Review*, 33: 92–104.
- Harvey, E. 1968. Technology and the structure of organizations. *American Sociological Review*, 33: 241–259.
- Hedges, L. V., & Olkin, I. 1985. *Statistical methods for meta-analysis*. New York: Academic Press.
- Heise, D. R. 1969. Problems in path analysis and causal inference. In E. F. Bogata & G. W. Bohrnstedt (Eds.), *Sociological methodology 1969*: 38–73. San Francisco: Jossey-Bass.
- * Hickson, D. J., Hinings, C. R., McMillan, C. J., & Schwitter, J. P. 1974. The culture-free context of organization structure: A tri-national comparison. *Sociology*, 18: 59–80.
- * Hickson, D. J., Pugh, D. S., & Pheysey, D. C. 1969. Operations technology and organization structure: An empirical reappraisal. *Administrative Science Quarterly*, 14: 378–397.
- Hinings, C. R., & Lee, G. L. 1971. Dimensions of organization structure and their context: A replication. *Sociology*, 5: 83–93.
- Hirst, M. 1984. A partial meta-analysis of the relationship between organization structure and production technology. *Australian Journal of Management*, 9(2): 35–42.
- * Horvath, D., McMillan, C. J., Azumi, K., & Hickson, D. J. 1981. The cultural context of organization control: An international comparison. In D. J. Hickson & C. J. McMillan (Eds.), *Organization and nation: The Aston programme IV*: 173–183. Hampshire, England: Gower Publishing Company.
- * Hrebiniak, L. G. 1974. Job technology, supervision, and work-group structure. *Administrative Science Quarterly*, 19: 395–410.
- Huber, G. P., Miller, C. C., & Glick, W. H. 1990. Developing more encompassing theories about the relationships between organizational design and organizational effectiveness. *Organization Sciences*, 1: 11–40.
- Hunter, J. E., Schmidt, F. L., & Jackson, G. B. 1982. *Meta-analysis: Cumulating research findings across studies*. Beverly Hills, CA: Sage Publications.
- Keller, R. T. 1978. Dimensions of management system and performance in continuous-process organizations. *Human Relations*, 31: 59–75.
- Keller, R. T., Slocum, J. W., Jr., & Susman, G. I. 1974. Uncertainty and type of management system in continuous process organizations. *Academy of Management Journal*, 17: 56–68.
- * Khandwalla, P. N. 1974. Mass output orientation of operations technology and organizational structure. *Administrative Science Quarterly*, 19: 74–97.
- * Khandwalla, P. N. 1977. *The design of organizations*. New York: Harcourt Brace Jovanovich.
- Kim, L., & Utterback, J. M. 1983. The evolution of organizational structure and technology in a developing country. *Management Science*, 29: 1185–1197.
- * Kmetz, J. L. 1977–78. A critique of the Aston studies and results with a new measure of technology. *Organization of Administrative Sciences*, 8(4): 123–144.
- * Koberg, C. S., & Ungson, G. R. 1987. The effects of environmental uncertainty and dependence on organizational structure and performance: A comparative study. *Journal of Management*, 4: 725–737.
- * Kuc, B., Hickson, D. J., & McMillan, C. J. 1981. Centrally planned development: A comparison

- of Polish factories with equivalents in Britain, Japan and Sweden. In D. J. Hickson & C. J. McMillan (Eds.), *Organization and nation: The Aston programme IV*: 75–91. Hampshire, England: Gower Publishing Company.
- * Leatt, P., & Schneck, R. 1981. Nursing subunit technology: A replication. *Administrative Science Quarterly*, 26: 225–236.
 - * Leatt, P., & Schneck, R. 1982. Technology, size, environment, and structure in nursing subunits. *Organization Studies*, 3: 221–242.
 - * Lincoln, J. R., & Kalleberg, A. L. 1985. Work organization and work-force commitment: A study of plants and employees in the U.S. and Japan. *American Sociological Review*, 50: 738–760.
 - * Lincoln, J. R., Hanada, M., & McBride, K. 1986. Organization structures in Japanese and U.S. manufacturing. *Administrative Science Quarterly*, 31: 338–364.
 - * Marsh, R. M., & Mannari, H. 1981. Technology and size as determinants of the organizational structure of Japanese factories. *Administrative Science Quarterly*, 26: 33–57.
 - * Miller, D. 1987. Strategy making and structure: Analysis and implications for performance. *Academy of Management Journal*, 30: 7–32.
 - * Miller, D., & Droge, C. 1986. Psychological and traditional determinants of structure. *Administrative Science Quarterly*, 31: 539–560.
 - Miller, D., & Toulouse, J. M. 1986. Strategy, structure, CEO personality and performance in small firms. *American Journal of Small Business*, 10(3): 47–62.
 - Miller, N., & Carlson, M. 1990. Valid theory-testing meta-analyses further question the negative state relief model of helping. *Psychological Bulletin*, 107: 215–225.
 - Mills, P. K., & Moberg, D. J. 1982. Perspectives on the technology of service operations. *Academy of Management Review*, 17: 467–478.
 - Mills, P. K., & Morris, J. H. 1986. Clients as "partial" employees of service organizations: Role development in client participation. *Academy of Management Review*, 11: 726–735.
 - Mohr, L. B. 1971. Organizational technology and organizational structure. *Administrative Science Quarterly*, 16: 444–459.
 - Mossholder, K. W., & Bedeian, A. G. 1983. Cross-level inference and organizational research: Perspectives on interpretation and application. *Academy of Management Review*, 8: 547–558.
 - Negandhi, A. R., & Reimann, B. C. 1973. Correlates of decentralization: Closed and open systems perspectives. *Academy of Management Journal*, 16: 570–582.
 - * Organ, D. W., & Greene, C. N. 1981. The effects of formalization on professional involvement: A compensatory process approach. *Administrative Science Quarterly*, 26: 237–252.
 - * Overton, P., Schneck, R., & Hazlett, C. B. 1977. An empirical study of the technology of nursing subunits. *Administrative Science Quarterly*, 22: 203–219.
 - Paulson, S. K. 1980. Organizational size, technology, and structure: Replication of a study of social service agencies among small retail firms. *Academy of Management Journal*, 23: 341–347.
 - Pennings, J. 1973. Measures of organizational structure: A methodological note. *American Journal of Sociology*, 70: 686–704.
 - Perrow, C. 1967. A framework for the comparative analysis of organizations. *American Sociological Review*, 32: 194–208.
 - Pfeffer, J. 1978. *Organizational design*. Arlington Heights, IL: AHM Publishing Company.
 - Pugh, D. S., Hickson, D. J., Hinings, C. R., & Turner, C. 1989. The context of organization structures. *Administrative Science Quarterly*, 14: 91–114.

- * Reimann, B. C. 1977. Dimensions of organization technology and structure: An exploratory study. *Human Relations*, 30: 545–566.
- * Reimann, B. C. 1980. Organization structure and technology in manufacturing: System versus work flow level perspectives. *Academy of Management Journal*, 23: 61–77.
- Reimann, B. C., & Inzerilli, G. 1981. Technology and organization: A review and synthesis of major research findings. In G. W. England, A. R. Negandhi, & B. Wilpert (Eds.), *Functioning of complex organizations*: 237–250. Cambridge, MA: Oesgeschlager, Gunn, & Hain.
- Roberts, K. H., Hulin, C. L., & Rousseau, D. M. 1978. *Developing an interdisciplinary science of organizations*. San Francisco: Jossey-Bass.
- Rushing, W. A. 1968. Hardness of material as related to division of labor in manufacturing industries. *Administrative Science Quarterly*, 13: 229–245.
- Sackett, P. R., Harris, M. M., & Orr, J. M. 1986. On seeking moderator variables in the meta-analysis of correlational data: A Monte Carlo investigation of statistical power and resistance to type I error. *Journal of Applied Psychology*, 71: 302–310.
- SAS Institute. 1985. *SAS user's guide: Basics* (version 5 ed.). Cary, NC: SAS Institute.
- Sathe, V. 1978. Institutional versus questionnaire measures of organizational structure. *Academy of Management Journal*, 21: 227–238.
- Saxberg, B. O., & Slocum, J. W., Jr. 1968. The management of scientific power. *Management Science*, 14: 473–489.
- Scott, W. R. 1990. Technology and structure: An organizational-level perspective. In P. S. Goodman, L. S. Sproul, & Associates (Eds.), *Technology and organizations*: 109–143. San Francisco: Jossey-Bass.
- Seidler, J. 1974. On using informants: A technique for collecting quantitative data and controlling measurement error in organization analysis. *American Sociological Review*, 39: 816–831.
- Shenoy, S. 1981. Organization structure and context: A replication of the Aston study in India. In D. J. Hickson & C. J. McMillan (Eds.), *Organization and nation: The Aston programme IV*: 133–154. Hampshire, England: Gower Publishing Company.
- * Shrader, C. B., Lincoln, J. R., & Hoffman, A. N. 1989. The network structures of organizations: Effects of task contingencies and distributional form. *Human Relations*, 42: 43–66.
- Shrout, P. E., & Fleiss, J. L. 1979. Intraclass correlations: Uses in assessing rater reliability. *Psychological Bulletin*, 86: 420–428.
- * Singh, J. 1986. Performance, slack, and risk taking in organizational decision making. *Academy of Management Journal*, 29: 562–565.
- Slocum, J., & Sims, H. 1980. A typology of technology and job redesign. *Human Relations*, 33: 193–212.
- Snyder, C. A., Cox, J. F., & Jesse, R. R. 1982. A dependent demand approach to service organization planning and control. *Academy of Management Review*, 7: 455–466.
- Spector, P. E., & Levine, E. L. 1987. Meta-analysis for integrating study outcomes: A Monte Carlo study of its susceptibility to type I and type II errors. *Journal of Applied Psychology*, 72: 3–9.
- Sutton, R. I., & Rousseau, D. M. 1979. Structure, technology, and dependence on a parent organization: Organizational and environmental correlates of individual responses. *Journal of Applied Psychology*, 64: 675–687.
- Thompson, J. 1967. *Organizations in action*. McGraw-Hill Book Co.
- * Tracy, P., & Azumi, K. 1976. Determinants of administrative control: A test of a theory with Japanese factories. *American Sociological Review*, 41: 80–94.
- * Van de Ven, A. H., Delbecq, A. L., & Koenig, R., Jr. 1976. Determinants of coordination modes within organizations. *American Sociological Review*, 41: 322–338.

- Van de Ven, A. H., & Drazin, R. 1985. The concept of fit in contingency theory. In L. L. Cummings & B. M. Staw (Eds.), *Research in organizational behavior*, vol 7: 333–365. Greenwich, CT: JAI Press.
- * Van de Ven, A. H., & Ferry, D. 1980. *Measuring and assessing organizations*. New York: Wiley.
- Wachter, K. W. 1988. Disturbed by meta-analysis? *Science*, 241: 1407–1408.
- Withey, M., Daft, R. L., & Cooper, W. H. 1983. Measures of Perrow's work unit technology: An empirical assessment of a new scale. *Academy of Management Journal*, 26: 45–63.
- Woodward, J. 1958. *Management and technology*. London: H.M.S.O.
- Woodward, J. 1965. *Industrial organization: Theory and practice*. London: Oxford Press.
- * Yasai-Ardekani, M. 1989. Effects of environmental scarcity and munificence on the relationship of context to organizational structure. *Academy of Management Journal*, 32: 131–156.
- Zeffane, R. 1981. Context, technology and organization structure revisited: A tri-national study. In R. Mansfield & M. Poole (Eds.), *International perspectives on management and organization*: 84–96, Hampshire, England: Gower Publishing Company.
- * An asterisk (*) denotes that a referenced work is an empirical study of one or more of the three technology-structure relationships. Note that ten of these studies were not used in our analyses because they were based on data used in other studies.

C. Chet Miller received his doctoral degree in organizational studies from the University of Texas at Austin and currently is an assistant professor of management at Baylor University. His current research interests are centered on top management teams and organizational design.

William H. Glick earned his Ph.D. degree at the University of California at Berkeley and currently is an associate professor of management at the University of Texas at Austin. Most of his research is on job and organizational design.

Yau-De Wang is a doctoral student at the University of Texas at Austin. His research interests include computerization of work and technological innovation and change in organizations. Recent work has focused on computerization of work, organizational structure, and performance.

George P. Huber is the Fondren Foundation Chaired Professor of Business at the University of Texas at Austin. His research focuses on organizational design, decision making, and information systems.

RELATIONSHIPS AMONG GOAL DIFFICULTY, BUSINESS STRATEGIES, AND PERFORMANCE ON A COMPLEX MANAGEMENT SIMULATION TASK

AMELIA A. CHESNEY

Georgia Institute of Technology

EDWIN A. LOCKE

University of Maryland at College Park

A complex, strategic management, computer simulation was used over a ten-week period to examine the effect of goal difficulty and use of business strategies on firm performance. Participants developed a limited number of competitive business strategies, similar to well-known strategies identified in strategic management research, to deal with task complexity. Both goals and strategies had significant effects on performance, but the effect of strategy was stronger than that of goals. In addition, goals affected strategies, and strategies moderated the goal-performance relationship.

The finding that goal setting positively affects task performance has been well documented in both laboratory and field studies (Latham & Yukl, 1975; Locke, Shaw, Saari, & Latham, 1981). Further, recent meta-analyses have corroborated the validity of goal-setting theory's major premise, which is that specific, challenging goals lead to higher performance than vague, easy goals (e.g., Mento, Steel, & Karren, 1987; Tubbs, 1986; Wood, Mento, & Locke, 1987). One of the more neglected topics in goal-setting research, however, has been the effects of goals on the performance of complex tasks. This article explores that topic and also extends, for the first time, goal-setting research into the realm of macro-level or business strategies, albeit using a simulation.

In their meta-analysis of goal-setting studies from 1966 to 1985, Wood, Mento, and Locke (1987) found that task complexity acted as a moderator of goal-setting effectiveness. Wood and colleagues analyzed studies contrasting the effects of low, "do your best" goals and specific, challenging goals and found that the effects of specific, challenging goals are significantly greater for simple tasks like reacting quickly or brainstorming than for more complex tasks like business game simulations, scientific and engineering work, and faculty research productivity. The apparent reason for this is that on simple tasks, direct goal mechanisms such as effort, direction, and persis-

The authors would like to thank Daniel Power for his assistance in the preparation of this study.

tence (Locke et al., 1981) improve performance almost automatically. On complex tasks such direct mechanisms may not work as well because many possible strategies can be used to perform the task, and some work better than others. In line with this reasoning, Wood and Locke (1990) proposed that the quality of the strategy used will play a progressively greater role in performance as the task becomes more complex. The effect of goals on the performance of complex tasks, then, would be at least in part contingent on the quality of the strategy used.

This is not to say, however, that goals as such will have no effect on performance when tasks are complex. Several studies have shown significant goal effects on such tasks, as Wood and colleagues (1987) acknowledged. Taylor, Locke, Lee, and Gist (1984), for example, found that the difficulty of college faculty members' research goals were significantly related to their research productivity in terms of numbers of publications. Edmister and Locke (1987), using a complex bank loan simulation task, found that groups who, for example, made yield a high priority performed better on that goal than subjects who made yield a low priority. The same was found for other goals, such as the net income achieved. Locke and Somers (1987) found that goals for limiting processing time for court-martials in a branch of the U.S. Air Force significantly affected actual processing time if there was commitment to the goals. Smith, Locke, and Barry (1990) found that goals affected the performance of work groups (each group constituting an "organization") on a management simulation task. They found that specific, challenging goals had a strong effect on performance, but only during the later sessions of a planning simulation; during the early sessions, the goal effect was borderline. They hypothesized that the lag in the effect of specific, challenging goals was a function of task complexity, with specific goals producing performance effects only after appropriate plans, or strategies, were developed and put into action. Earley, Northcraft, Lee, and Lituchy (1990) found that subjects with specific, hard goals and feedback chose better strategies on an investment task than subjects without such goals and feedback. Latham, Mitchell, and Dossett (1978) studied a highly complex job (engineering and scientific work), but the goals set involved behaviors rather than outcomes. These behaviors were items on a behavioral checklist derived from a critical incidence study of engineers and scientists; sample behaviors from the list included such activities as showing integrity and planning. Latham and colleagues found that the setting of specific, hard goals increased the frequency with which the engineers and scientists engaged in these behaviors. Using a complex factory management simulation, Wood and Bandura (1989) found in three studies that both goal difficulty and analytic strategy, defined as the procedure used to make decisions, were significantly related to performance. The effect of analytic strategies on performance was stronger than that of goals.

However, each of the studies cited above had possible flaws. Taylor and colleagues (1984) used a concurrent correlational design, thus precluding unequivocal conclusions about causality. Edmister and Locke (1987) did not

measure strategies at all. The Locke and Somers (1987) study was a naturally occurring field experiment without a randomized control group. Furthermore, goal commitment or emphasis rather than goal level was the independent variable. In the Earley, Northcraft, Lee, and Lituchy (1990) experiment, a data base that subjects could query virtually provided the strategy content, and thus subjects did not have to discover that content by inferences from performance outcomes alone. Latham and colleagues (1978) used behavior rather than performance as the dependent variable; it may be easier for scientists and engineers to regulate their actions (e.g., keeping up to date by reading) than the outcomes of their actions (e.g., the usability of inventions). The Wood and Bandura (1989) studies avoided the above problems since the designs were experimental; goal difficulty did vary and the dependent variable was performance in each case. However, they never measured strategy content—the actual strategies used. In the present study, this limitation was avoided since we measured the types of strategies used. Further, the task we examined was even more complex than the task in the Wood and Bandura studies, according to Wood's (1986) criteria for task complexity, which include the number of elements involved, need for coordination of the elements, and changes in relationships between the elements over time. In Wood and Bandura's studies, subjects had to make between 12 and 32 decisions in each period, whereas in the simulation task we used, potentially up to 63 decisions had to be made in each period. In both studies, people had to coordinate different task elements whose relationships changed over time. Thus, the present study posed a considerable challenge to goal theory because it used one of the most complex tasks employed in an experimental design to date. In line with previous results, we predicted

Hypothesis 1: Goal difficulty will affect performance on a complex task.

Locke and Latham (1990) argued that goal difficulty will affect performance even when goals are general; however, the present study dealt only with specific goals.

GOALS AND STRATEGIES

Locke and Latham (1990) extensively reviewed the micro literature on goals and task strategies. They concluded that setting or accepting specific, challenging goals as compared to specific, easy goals or a goal of doing your best leads to (1) more spontaneous development or use of task strategies (e.g., Latham & Baldes, 1975; Terborg, 1976), (2) more spontaneous planning (e.g., Earley, Lee, & Hanson, 1990; Earley & Perry, 1987; Earley, Wojnaroski, & Prest, 1987), (3) greater use of strategies that are provided to the subjects indirectly, through priming (e.g., Earley & Perry, 1987; Earley, Northcraft, Lee, & Lituchy, 1990), or directly, through formal training (e.g., Earley, Connolly, & Lee, 1988; Earley, Lee, & Lituchy, 1989), and (4) the development of better analytic strategies (Wood & Bandura, 1989) that in turn enhance the quality of decisions.

The logic underlying these results is that people recognize that goals can

be achieved not just by working hard and persistently or by paying attention, but also by "working smart" (Wood & Locke, 1990). Thus, it is natural for people confronted by a goal to think about how they might achieve it and to put into action the task strategies they discover or have been taught. Developing and using such strategies does not just make goal attainment easier than it would be otherwise; using strategies may be the only way to attain the goal if the task is complex and performance is time-limited. This is especially the case when a goal is difficult because ordinarily there are fewer strategies that will work for attaining a very hard goal than a very easy goal. Thus, people with hard goals should be more motivated than those with easy goals to choose or use effective strategies (Earley et al., 1988).

Researchers in strategic management typically view strategies as discrete phenomena, portraying companies, for example, as using single strategies. Typologies have been used to simplify the numerous variables that can categorize one strategy. Studies have required participants to select one complete strategy over another complete strategy (Miles, Snow, Meyer, & Colman, 1978) rather than to specify the individual variables making up the content of a strategy. Several authors have criticized this procedure (Dess & Davis, 1984; Galbraith & Schendel, 1983; Robinson & Pearce, 1988; Venkatraman & Grant, 1986), arguing the need to measure individual strategy components and employ factor analytic measurement techniques. If a strategy is actually composed of numerous specific actions that do not perfectly covary, it implies that strategies might best be viewed as continuous variables. In the literature on goal setting, researchers have typically viewed strategy as a continuous variable. We will discuss this issue further below but will treat strategy as a continuous variable from this point on. Our next hypothesis, then, is:

Hypothesis 2: People with difficult goals will use better strategies to a greater degree than people without difficult goals.

Although goals may affect strategy choice or use, people with challenging goals may not always be able to discover effective task strategies. For example, Huber (1985) found that individuals who had set a difficult goal adopted dysfunctional performance strategies for both a simple and a complex version of a computerized maze task; it is important to note, however, that she penalized her subjects for adopting the most useful task strategy—peeking at the maze. Earley and Perry (1987) found that planning was positively associated with performance only when the plan was appropriate to the task; unsuitable plans led to poorer performance than no plans. Earley, Connolly, and Ekegren (1989) found, in three studies with a stock price prediction task, that specific hard goals led to poorer performance than the goal "do your best" because the subjects with hard goals chose poorer strategies than the others. Earley, Lee, and Lituchy (1989) found the same results for their untrained subjects; only their trained subjects performed well with hard goals. Earley, Northcraft, Lee, and Lituchy (1990) found that the subjects with hard goals who used the best strategies were those who received

very useful strategy information, which the authors called specific process feedback. Thus,

Hypothesis 3: The quality or suitability of a chosen strategy, measured in terms of its degree of use, will at least partially mediate the relationship between goal difficulty and performance on a complex task.

An alternative to the mediation hypothesis is a moderator hypothesis. The relationship between goal difficulty and performance may increase with the use of a suitable strategy. This would be revealed by a goal-strategy interaction effect in addition to any main effects for these variables. Although we did not formally postulate a moderator relationship, our analysis could test for it.

If strategies only partially mediate the goal-performance relationship, goal difficulty will still have an independent effect on performance on complex tasks through the direct mechanisms of effort, persistence, and direction. Wood and Locke (1990) argued that since task strategies become increasingly important as task complexity increases, the relationship between strategies and performance will become progressively stronger as complexity increases. At the same time, the correlation between goals and performance (via the direct mechanisms) should become progressively weaker. Thus, even if goal difficulty has a main effect, the effect of strategy on a complex task should be stronger than the effect of goal difficulty.

It is now necessary to discuss the concept of strategy in more detail. In the micro goal-setting literature, authors have mainly used the term strategy to refer to task-specific plans or methods of performing a task, such as how to load a truck to maximum capacity. In the present study, however, we also used the term strategy in the wider sense characteristic of the macro, or business strategy, literature. This is, in fact, the first goal-setting study to incorporate macro-level strategies. Hambrick (1980) defined strategy as a pattern of important decisions that guide the organization in relationship with its environment and that affect the internal structure and process of the organization including its performance. This definition is adapted from Hambrick (1980) and is used because the task employed in this research project was a computer simulation of strategic management decisions. The simulation was selected as the experimental task because it allowed participants to develop competitive business strategies that could be compared to well-known strategies identified in the strategic management literature (Hofer & Schendel, 1978; Miles & Snow, 1978; Porter, 1980). Therefore, task strategy and competitive business strategy are one and the same in this study.

Research in strategic management has yielded several typologies of competitive business strategy (Galbraith & Schendel, 1983; Miles & Snow, 1978; Porter, 1980). Each typology has a limited number of strategies composed of several key strategy components. For example, Porter's (1980) strategy typology consists of three strategies: (1) overall cost leadership, a strategy in which firms achieve profit through efficiency, cost reductions, and building market share; (2) differentiation, in which firms sell a few high-

quality products with heavy investment in product development and advertising; and (3) focus, in which firms target a particular market segment, buyer group, geographic area, or product line to achieve a market niche through either an overall cost leadership or differentiation strategy. Miles and Snow's (1978) typology consists of three strategies very similar to Porter's. Additionally, both Porter and Miles and Snow identified an inconsistent, unstable, generally unprofitable strategic behavior pattern that Porter labeled "being stuck in the middle" and Miles and Snow labeled "reactor." Other well-defined strategy typologies with a limited number of strategies similar to those already cited include those of Galbraith and Schendel (1983), Hofer and Schendel (1978), and Paine and Anderson (1983). Since in the present study the strategies were emergent—developed by the subjects themselves—we could not say in advance which, if any, of the above typologies would be the most useful. But the data did allow us to compare the emergent strategies with the typologies found in the literature.

It was assumed that the strategies developed, chosen, or used would have a significant effect on performance in the simulation. In line with the theorizing of Wood and Locke (1990), we predicted that

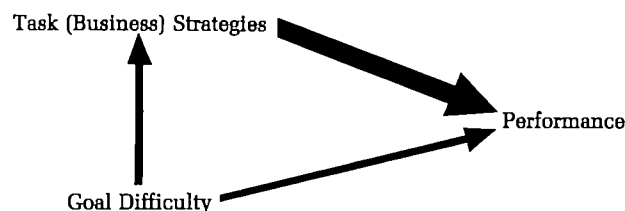
Hypothesis 4a: On a complex task, task (business) strategies will have a significant effect on performance.

Hypothesis 4b: On a complex task, task (business) strategies will have a stronger effect than goal difficulty alone on performance.

This hypothesis does not refer to any particular strategies since we did not know in advance what strategies participants would choose, but we assumed that the hypotheses would hold most strongly, if not exclusively, for the most effective strategies found in a particular task or business situation.

Figure 1, which shows the basic model guiding this study, reveals all four hypotheses directly or by implication. The direct line from goal difficulty to performance indicates a direct goal effect (Hypothesis 1). The line from goals to strategies indicates an effect of goal difficulty on strategy choice or use (Hypothesis 2). The fact that goals affect strategies, which in

FIGURE 1
Relationships of the Variables^a



^a The thick arrow indicates a stronger effect than the thin arrows.

turn affect performance, implies a partial mediating effect of strategies on the goal-performance relationship (Hypothesis 3). And the thick line from strategies to performance indicates a direct main effect of strategies that is stronger than the main effect of goals (Hypothesis 4a and 4b).

A unique contribution of this study is the attempt to use concepts from both the micro and macro literatures on goals and strategies. Smith and colleagues' (1990) study used a business simulation, a goal manipulation, and a measure of planning. However, the planning variable measured rated plan attributes, such as comprehensiveness, rather than plan content. The present study was the first experimental, micro-macro investigation in which strategy type or content was measured along with goals, and it was also the first to study goals in relation to business strategies.

METHODS

Sample

The sample consisted of 132 graduating seniors enrolled in three sections of an upper-level course in strategic management at a large eastern university. In the simulation used, each student represented one firm.

Task

Students participated in a computer-simulated strategic management business game called Tempomatic IV (Scott & Strickland, 1980) in return for course credit. This simulation requires that firms compete against each other within an industry to sell tempomatics, a generic product usually identified as a small household appliance. In this study, 16 industries (groups) were used with seven to nine firms (individuals) per industry. Individuals competed against the other members of their group by assuming the role of president and sole decision maker for a firm.

When the strategic management simulation used here begins, eight financial quarters of simulated business activity have already occurred. Thus, firms are somewhat established and have plants, equipment, stock, and several tempomatics already produced, sold, and in inventory. Each firm and industry starts the simulation with exactly the same history. In this study, firm presidents were required to make business decisions for ten more quarters, or decision periods.

Each participant's objective is to outperform other firms on a set of financial performance measures by making effective decisions in all the functional areas of business: marketing, finance, accounting, management, production, and transportation. A game administrator assigns a predetermined value to each of the performance measures before the simulation commences. A series of mathematical equations defines the simulation's parameters. Participants were not informed of the value of the parameters nor told which financial performance measures accounted for their group rank. However, they were aware that these elements were part of the simulation.

The simulation requires each president to make decisions on the fol-

lowing 14 issues: number of markets served, advertising, number of salespersons, product improvements, price, number of products produced, production capacity, number of production workers, raw materials purchased, environmental information, financing, stock issuance, dividends, and short-term investment. Each decision has subcomponents based, for instance, on variations in the type of service or information acquired, their quality level, the market location of resources, and amounts of products, services, funding, or people deployed. These subcomponents increase the number of decisions that need to be made to potentially 63 per period. For example, to advertise the product a president must make separate decisions on whether to use national or local advertising, the amount to purchase, and the market areas in which to place it.

Participants' decisions are entered into the simulation's computer program according to the industry to which they belong. Each industry (group) is run as an independent program. The history of previous decisions is stored for every period, thereby making the effect of decision making cumulative. Thus, participants competed against the seven to nine other members of their group on the basis of both their past and present decisions.

This task was a dynamically complex task for several reasons. First, it involved a large number of decisions—potentially 630 (63×10) over the course of the simulation—and some of these decisions were highly complex. Second, participants had a large number of information cues to process before making decisions; cues included information about past decisions, the actions of other competitors, and environmental problems simulated by the game. Third, participants needed to coordinate and integrate the decisions and cues to develop a comprehensive and effective strategy. Fourth, both the decisions and cues changed over time as a result of the dynamic economic environment of the simulation as well as the past actions of the decision maker and other competitors.

Goal Manipulation

Goals were randomly assigned to the 16 industries before the start of the game via a letter from the game administrator who was called the chairman of the board. One-half of the presidents in each industry were given an easy goal through the following instruction: "Your goal for the next three years is to do your best to run a profitable company; some earnings are expected, but your rank with respect to other companies is not important." The other half of the presidents of each industry were given a hard goal, by being instructed that the chairman of the board expected "outstanding performance . . . your goal for the next three years is to achieve a performance ranking of one or two in your industry."

The easy goal, to make some profit, was very achievable given the conditions selected and imposed in the administration of the simulation. All but one of the game participants (99%) achieved the goal by the end of the game, demonstrating that it was truly "easy." However, only 24 percent of the students with the hard goal achieved their goal.

Procedures

Knowledge of business principles could influence the skills needed to compete in the simulation. Therefore, to control for such skills important to the simulation, participants were placed in groups on the basis of their grade point averages (GPAs) in business courses such as accounting, finance, marketing, and management. Participants were ranked from top to bottom in each class on the basis of GPA and divided into approximately equal-sized groups, placing A+ students with other A+ students and so forth. Thus, a C student would compete against other C students rather than against A or B students.

Before the start of the simulation, students read the *Tempomatic IV Simulation Game Manual* and attended two explanation sessions concerning the operation of the game. Following the explanation sessions, students made decisions for a practice trial, obtained the results of this trial, which included financial operating statements and performance rankings, and received explanations about the results. The experimental procedures are shown in Figure 2.

Goals were then assigned and grading explained. Students were instructed that they would receive an A grade for performance on the simulation if they turned in all their decision sets and met their assigned goal. All participants turned in all decision sets, and all but one student received an A for the easy goal. After the simulation was completed, students with the hard goal who had not reached their goal were graded on whether or not they reached the easy goal to ensure fairness for all. All but one student obtained an A for performance on the simulation.

Following the explanation of grades, the simulation began and continued for ten trials, one per week. During this time, data was collected on strategies used, acceptance of assigned goals, and performance results.

Feedback

After each decision trial, five pages of computer-generated financial operating statements were provided to each firm president. These statements reflected the competitive position of the firms after the simulated business activities of each group had occurred. The statements included a production analysis, a manufacturing cost-of-goods-sold statement, a warehouse operations statement, a selling and administrative expense analysis, a cash flow statement, a statement of income, and a statement of financial position.

Performance feedback was provided to each participant in terms of their overall group rank after each decision period. This rank was based on equal weighting of seven financial performance measures: sales, income after tax, earnings per share, return on sales, return on assets, return on equity, and stock price. Performance measures were calculated for each independent decision period and cumulatively across all decision periods (i.e., the game-to-date results). Performance information on each of the seven individual financial measures was not provided; instead participants were only in-

FIGURE 2
Sequence of Procedures

Preparation		
<hr/>		
Simulation read	Learning the Game	
Explanation session one		
Explanation session two		
Practice trial		
Results of practice trial		
Explanation of results		
<hr/>		
Simulation		
Goals issued	Decision Period	Financial
Grades explained		Quarter
Strategy profile questionnaire administered	Game begins	
Operating statements and performance results provided for each decision period	1	9
	2	10
	3	11
	4	12
	5	13
Strategy profile questionnaire administered	6	14
	7	15
	8	16
	9	17
	10	18
Strategy profile questionnaire administered	Game ends	
Goal questionnaire administered		

formed about their overall group rank on the combined indicators. However, participants could calculate financial ratios on their own with the financial operating statements provided after each decision period. Thus, the firm presidents assigned the easy goal "to make some profit" could determine if they were accomplishing their goal, and those assigned the hard goal knew whether they ranked as number one or two in their group.

Measures

Goals. A goal questionnaire, developed to serve as both a manipulation check testing students' acceptance of the assigned goals and a measure of personal, self-set goals, was administered at the end of the simulation. The questionnaire appears in the Appendix.

Two variables were used to measure goals. The first, assigned goal difficulty, represented the goal assigned in the letter from the chairman of the board and had two levels: hard (try to rank first or second in your group) and easy (make some profit). The second variable, personal goal difficulty, represented a student's personal, self-set goal. The personal goal might be the same as the student's assigned goal or it might represent a change to a higher or lower goal. The personal goal score was based on responses to five questionnaire items. Each question was scored dichotomously as indicating either a hard or easy goal; the overall score was the total number of responses rated "hard." Thus, the personal goal variable ranged along a five-category continuum from a very consistent rating of a hard personal goal to a very consistent rating of an easy personal goal. Two raters scored the open-ended items; interrater reliability was .97, and differences were discussed and resolved. The Pearson correlation between the assigned goal and personal goal variables was nonsignificant, a result indicating that the goal manipulation failed. Thus, the goal variable actually used was each individual's personal goal. Since that variable was based on responses to five different questionnaire items, we considered it to be a stable and valid measure. Numerous studies have shown that personal goals are related to performance as strongly, if not more strongly, than assigned goals (Locke & Latham, 1990).

Strategies. Three different approaches were used to measure strategy, two based on a questionnaire and the third on data from the simulation. The questionnaire was devised after an initial review of the Miles and Snow business strategy typology (Miles & Snow, 1978; Miles et al., 1978) with actions associated with each type of strategy abstracted and action statements developed into questionnaire items. This process was repeated using the following additional strategy typologies: Kotler (1976), Hofer and Schendel (1978), Paine and Anderson (1983), and Porter (1980). The questionnaire was administered at the beginning, middle, and end of the simulation: before decision period 1 and after decision periods 5 and 10. It was then scored in two ways. In the first questionnaire-scoring method, second-year M.B.A. students categorized strategies on the basis of items from the questionnaire; one of the authors and another faculty member reviewed these categorizations and then developed an a priori classification schema, grouping questionnaire items that represented a synthesis of strategy archetypes found in the theoretical literature (interrater reliability = .95). Strategies were formed by summing the questionnaire items based on the administration of the questionnaire, with decision periods 1, 2, and 3 representing time 1, decision periods 4, 5, 6, and 7 representing time 2, and decision periods 8 and 9 representing time 3. In the second questionnaire-scoring method, items from

the questionnaire were factor-analyzed using the principle component method with varimax rotation and eliminating items loading below .30 from the factor structure. Items were then summed based on the three time periods. In the third approach to measuring strategy, data were gathered from the actual decisions made during each of the ten decision periods of the simulation. The variables were converted to z-scores and summed based on the three time periods. Grouping the decision periods reduced the number of variables and paralleled the periods represented in the data from the strategy questionnaire. A decision period occurred each week, so the game required ten weeks to complete. The data were factor analyzed for each of the three time periods using the principal component method, varimax rotation with variables loading below .30 eliminated from the factor structure. The results of the third approach were used because they were based on the actual decisions made during the simulation and were therefore the most objective. Table 1 shows those results.

Four discernible factors or strategies were identified and named volume, quality, scan, and focus. These strategies, collectively labeled the behavioral strategy typology, were quite similar to Porter's strategies, with the volume strategy similar to overall cost leadership, the quality strategy similar to differentiation, and the focus strategy similar to Porter's focus strategy. The scan strategy, which requires a planned and systematic approach for dealing with the environment, is inversely related to Porter's "stuck in the middle" strategy, which is not really a strategy, but rather a way of chaotically responding to environmental forces. These strategies are defined as follows: (1) in the volume strategy, a firm achieves growth by keeping production levels high, increasing purchases of raw materials, hiring additional sales and production workers, and increasing sales through low prices; these activities are financed by increasing the amount of loans and stock issuance; (2) to use the quality strategy, a firm sells relatively few high-quality products at high prices; these sales are achieved by making continual and substantial improvements to the product, strongly promoting it locally and nationally, and constantly seeking environmental information about competitors' prices and sales; (3) in a scan strategy, a firm incurs substantial costs by seeking external environmental information about its competitors' sales, prices, production capacity, advertising budget, and number of salespersons and production workers; (4) finally, a firm using a focus strategy serves a narrow target market by concentrating units for sale and salespeople in a specific area and supporting its sales effort through local advertising.

All participants received a score on each strategy based on their factor score for items that loaded on that strategy. It is customary in research on strategy to sort firms into strategy types for purposes of analysis, but as noted earlier, we chose to treat strategies as continuous variables. A major reason for our doing so was that the distribution of scores on the strategy factors was roughly normal rather than bimodal. Thus, much information would have been lost if we had forced our firms into dichotomous categories.

TABLE 1
Behavioral Strategies^a

Variables	Factors ^b							
	Volume		Quality		Scan		Focus	
	Time 2	Time 3	Time 2	Time 3	Time 2	Time 3	Time 2	Time 3
1. Total salespersons	.42	.64	.30	.11	-.04	.05	-.14	-.13
2. Total units produced	.87	.88	-.01	-.04	-.09	-.01	-.14	-.17
3. Total production workers	.85	.86	.01	-.07	-.11	-.07	-.02	-.14
4. Total raw materials ordered	.87	.83	.10	.04	-.02	-.03	-.14	-.08
5. Total units sold	.79	.77	.02	.03	-.01	.27	-.22	-.11
6. Production level overall ^c	.44	.45	-.36	-.37	-.19	.05	-.09	-.20
7. Production level per quarter ^c	.60	.67	-.34	-.30	-.26	.06	-.08	-.21
8. Loans requested	.35	.55	.27	.35	-.21	-.22	.29	.05
9. Price ^c	-.43	-.45	.78	.68	-.11	.09	-.12	-.11
10. Price level ^c	-.44	-.47	.71	.61	-.05	.18	-.19	-.17
11. Total salespersons hired	.49	NA	-.02	-.07	.05	.15	.01	-.02
12. Total units for sale	NA	.72	.07	.06	-.17	-.16	-.16	-.09
13. Plants built	.53	NA	-.12	-.11	.20	.03	-.04	-.11
14. Stock issued	.47	NA	-.10	-.01	.19	.21	.02	.29
15. Total local advertising	.14	.11	.47	.52	-.08	-.02	-.16	.02
16. National advertising	.04	.02	.64	.62	-.11	.16	-.01	-.17
17. Product improvement level	-.20	-.06	.61	.78	.12	.06	.17	.16
18. Product improvements (over time)	-.16	-.12	.57	.69	-.03	-.04	.04	.08
19. Price ^c	-.45	-.45	.73	.68	-.10	.09	-.12	-.11
20. Price level ^c	-.43	-.47	.71	.61	-.05	.18	-.19	-.16
21. Production level overall ^c	.44	.45	-.36	-.37	-.19	.05	-.09	-.20
22. Production level per quarter ^c	.60	.67	-.34	-.30	-.26	.06	-.08	-.21
23. Sales (units) ^d	.20	.15	.47	NA	.49	.66	.03	.05
24. Price (product) ^d	.20	.10	.46	NA	.46	.76	.10	.01
Environmental information sought about other firms								
25. Total cost environmental information	.24	-.01	.33	.19	.60	.81	.16	.09
26. Number of sales persons	-.08	.07	.04	-.10	.63	.33	-.05	.04
27. National advertising (pages)	-.14	-.03	.16	.16	.70	.71	-.08	.07

TABLE 1 (continued)

Variables	Factors ^b							
	Volume		Quality		Scan		Focus	
	Time 2	Time 3	Time 2	Time 3	Time 2	Time 3	Time 2	Time 3
28. Local advertising (pages)	-.12	-.01	.16	.09	.70	.73	-.09	.06
29. Sales (units) ^d	.20	.15	.47	.24	.49	.66	.03	.06
30. Price (product) ^d	.20	.10	.46	.27	.46	.76	.10	.01
31. Production capacity (units)	.19	-.03	-.24	-.09	.43	NA	-.08	-.07
Sales potential (predicted)								
32. Four quarters in advance	.08	NA	-.27	NA	.33	NA	.06	NA
33. One quarter in advance	.14	-.12	.32	.08	.04	.40	.16	.08
Narrow market for								
34. Local advertising	-.13	-.05	-.06	-.09	.19	-.01	.68	.76
35. Salespersons	-.35	-.24	-.07	.05	.11	-.07	.82	.83
36. Units for sale	-.27	-.16	-.12	-.04	.01	.01	.87	.90
37. Units sold	-.27	-.13	-.12	.03	.10	.07	.81	.89

^a N = 132. Factors with significant loadings are shown boldface.

^b Time 1 includes decision periods 1, 2, and 3; time 2 includes decision periods 4, 5, 6, and 7; and time 3 includes decision periods 8, 9, and 10. Factor loadings were meaningful only for times 2 and 3; during time 1, participants were formulating their strategies; therefore, the results of the factor analyses for time 2 served as the guide for constructing the strategies for time 1. "NA" indicates a variable was not appropriate in a given period because of constraints on the simulation; for instance, participants would not spend money to build plants when the semester was about to end.

^c The variable is repeated because it is used inversely; for instance (high vs. low) with a positive loading representing a high price or a high production level and a negative loading representing a low price or a low production level.

^d The variable is found in two different strategies and is appropriate to both.

Factor structures derived from the other two methods (not shown) were similar to the structure shown in Table 1. Correlational analysis revealed that there was reasonable convergence among the three sets of strategy factors for times 2 and 3, when clear strategies had emerged, for both the volume and quality strategies. Correlations between the volume strategy based on the behavioral method and the volume-type strategy scores from the other two typologies at time 2 were both .63 ($p < .001$); at time 3, the correlations were .59 and .60 ($p < .001$). For the quality strategy, correlations ranged from .71 to .75 ($p < .001$) for the two time periods. There was only fair convergence among the three sets for the focus strategy, with correlations ranging from .36 to .49 ($p < .001$). Finally, for the scan strategy, convergence between the factors derived from the behavioral approach and those from the other two methods was poor, with correlations ranging from .17 to .20 ($p < .01$). However, the scan strategy is not a well-developed strategy; it only entails scanning an environment, with any resulting actions not specified.

As was expected, clear strategy factors did not emerge during time 1 (representing decision periods 1, 2, and 3) since participants were still in the process of formulating their strategies. For purposes of additional data comparison, however, strategy scores were constructed for time 1 using the results of the factor analyses for times 2 and 3. The internal consistency of the strategies was assessed using Cronbach's coefficient alpha; alphas for the behavioral strategies ranged from .70 to .93, with most in the .80s to .90s. Thus, the factor structure derived from the behavioral approach represents a reasonably good measure of strategies as evidenced by (1) the stability of the factor structure over times 2 and 3 and (2) convergence of the factors with other measures.

Correlational analysis revealed that of the four behavioral strategies, the volume strategy was the most effective in terms of predicting performance, and it was thus the main strategy variable used in subsequent analyses. The volume strategy was inversely related to both the quality strategy (r 's = $-.51$, $-.55$, and $-.50$, $p < .001$, for times 1, 2, and 3) and the focus strategy (r 's = $-.24$, $-.27$, and $-.28$, $p < .01-.001$). Given the characteristics of the strategies, these relations were predictable. The quality and the scan strategies were moderately correlated ($r = .37$, $p < .001$, $r = .44$, $p < .001$, and $r = -.20$, $p < .01$ for times 1, 2, and 3); the fact that scanning is important to developing a quality strategy probably accounts for this correlation. There was no relationship between the quality and focus strategies nor the focus and scan strategies.

Performance. The seven performance variables were factor-analyzed for each of the ten decision periods through the principal component method using orthogonal, varimax rotation. The variables loaded on two distinct factors: factor 1, sales, consisted of the sales variable alone and had factor loadings of .93 to .99 throughout the ten decision periods, and factor 2, income, consisted of the six other financial variables (income after tax, earnings per share, return on sales, return on assets, return on equity, and stock price) and had factor loadings for all variables equal to or greater than .89 for all ten decision periods. Although the individual variables that made up factors 1 and 2 did not load at .30 or above on the respective opposite factor, Pearson correlations between the factors ranged from .32 to .44 ($p < .001$). This was not an unexpected result simply because sales affected the financial variables in factor 2. Thus, both factors are used as the performance variables in the data analyses. Since all the groups were combined for data analysis, within-group z -scores were used in all cases to provide a common metric across the groups.

RESULTS

Table 2 displays Pearson product-moment correlations for the goal variables and the behavioral strategies with the two performance factors (sales and income) at each of the three time periods. Inspection of these correlations shows that both the goal and strategy variables had significant effects on the performance factors.

TABLE 2
Correlations: Goals and Behavioral Strategies with Performance at Times 1, 2, and 3^a

Variables	Means ^b	s.d. ^c	Behavioral Strategies									Personal Goal		
			Volume			Quality			Scan			Focus		
			Time 1	Time 2	Time 3	Time 1	Time 2	Time 3	Time 1	Time 2	Time 3	Time 1	Time 2	Time 3
Personal goal ^d	3.26	1.48	1.48	.19*	.11	.05	.03	.02	-.05	-.17*	-.16*	-.05	-.16*	-.14†
Behavioral strategies														
Volume														
Time 1	0	0.39												
Time 2	0	0.49	.75***											
Time 3	0	0.59	.53***	.83***										
Quality														
Time 1	0	0.48	-.51***											
Time 2	0	0.53	0.51	-.38***	-.55***	.88***								
Time 3	0	0.51	-.31***	-.44***	-.50***	.75***	.86***							
Scan														
Time 1	0	0.30	.06			.37***								
Time 2	0	0.29	0.32	.11	-.02	.39***	.44***		.63***					
Time 3	0	0.36	.09	.06	-.05	.27***	.33***	-.20**	.33***	.52***				
Focus														
Time 1	0	0.69	-.24**			-.05			-.02					
Time 2	0	0.74	0.75	-.21**	-.27***	-.03	.06		-.06	.05		.69***		
Time 3	0	0.84	-.17*	-.22**	-.28***	.08	.14	.10	-.02	.14	.06	.39***	.79***	
Performance														
Sales														
Time 1	0	0.92	.59***	.43***	.26**	-.06	-.08	-.12†	.02	-.01	-.08	-.45***	-.29***	-.14†
Time 2	0	0.98	0.98	.55***	.38***	.14†	-.02	-.05	.16*	.03	-.01	-.47***	-.42***	-.24***
Time 3	0	0.99	.52***	.74***	.63***	.14†	-.03	-.11	.21**	.09	-.04	-.37***	-.41***	-.31***
Income														
Time 1	0	0.85	.13†	.01	-.01	-.07	-.06	-.06	.12	-.04	-.08	-.31***	-.21**	-.11†
Time 2	0	0.93	0.91	.06	-.02	-.17*	.07	.03	-.03	-.06	-.07	-.31***	-.19**	.01*
Time 3	0	0.96	.09	.02	-.17*	.12†	.06	.06	-.02	-.07	-.03	-.32***	-.20**	.02

^a N = 132. Time 1 was decision periods 1, 2, and 3; time 2 was decision periods 4, 5, 6, and 7; time 3 was decision periods 8, 9, and 10.

^b The strategies and performance variables are composed of numerous variables and are expressed as z-scores, thus all means equal zero.

^c Combined for all three time periods.

^d "Personal goal" represents goal difficulty.

† p < .10

* p < .05

** p < .01

*** p < .001

Hypothesis 1, which states that goal difficulty will affect performance on a complex task, was supported by significant correlations between personal goal and both performance factors for all three time periods, with one exception (i.e., $r = .14$, $p < .10$ for income goal difficulty at time 1). Otherwise, hard goals increased performance on sales (r 's = $.23-.30$, $p < .01-.001$) and on income (r 's = $.14-.29$, $p < .10-.001$).

An additional correlational analysis (not shown) using each of the ten decision periods instead of the three composite time periods revealed that the effect of personal goal on performance was delayed until the second decision period for both the sales ($r = .22$, $p < .05$) and the income performance factors ($r = .14$, $p < .10$). However, this effect increased later as strategies began to evolve, peaking between decision periods 3 and 5, with the highs being correlations of $.29$ ($p < .001$) for sales and $.33$ ($p < .001$) for income. The goal effect decreased in the latter part of the simulation, with lows occurring during the last decision period ($r = .16$, $p < .10$, sales; $r = .31$, $p < .001$, income).

There was weak support for Hypothesis 2. The coefficients for personal goal correlated positively with the degree of use of the volume strategy ($r = .19$, $p < .05$, and $r = .14$, $p < .10$, times 1 and 2). Also, personal goal correlated negatively with use of the focus strategy, which was the least successful strategy and to an extent the opposite of the volume strategy ($r = -.15$, $p < .05$, and $r = -.14$, $p < .01$, times 2 and 3). Goal difficulty (personal goal) was not, however, related to use of the quality strategy. Therefore, those participants with hard personal goals tended to employ the most successful strategy and reject the least successful strategy.

To see if strategy mediated the goal-performance relationship (Hypothesis 3), the effects of goal level and strategy on performance were determined using hierarchical regression analysis (see Table 3). Personal goal, the volume strategy, and the interaction of these two variables were employed as predictors for both performance factors. Two sets of regression equations were computed; in the first, goal was entered first, strategy second, and the interaction term last, and in the second, strategy was entered first, goal second, and the interaction term last. The results shown in Table 3 illustrate the lack of a mediator effect. The goal effect remained significant even when strategy was entered first; further, the order of the variables' entry little affected the size of the goal effect, indicating scant evidence for even partial mediation. The strategy effect for income would have been stronger for times 1 and 2 had we used the focus strategy as a predictor instead of volume strategy (see Table 2). However, the effect of this focus strategy disappeared by time 3. Basically, none of the strategy factors predicted income very effectively.

The existence of a goal-strategy interaction would be evidence that use of the volume strategy had a moderating effect. Table 3 reveals that such an interaction was significant only for the sales performance for time 3. The form of the moderation is revealed by assessing the differences between the goal-sales performance correlations when a high level of strategy is used

TABLE 3
Results of the Hierarchical Regression Analysis^a

Dependent	Variables	Independent ^b	df	R ²			ΔR^2			Incremental F		
				Time 1	Time 2	Time 3	Time 1	Time 2	Time 3	Time 1	Time 2	Time 3
Sales	1. Personal goal		1	.05	.09	.05	.05	.09	.05	7.02**	13.20***	7.32**
	2. Strategy		2	.35	.43	.45	.30	.34	.40	60.12***	77.91***	92.79***
	3. Personal goal \times strategy		3	.35	.44	.50	.01	.01	.05	0.14	1.66	12.14**
Income	1. Strategy		1	.34	.38	.40	.34	.39	.40	66.48**	81.65***	86.85***
	2. Personal goal		2	.05	.09	.05	.02	.05	.05	2.89†	10.99**	11.45**
	3. Strategy \times personal goal		3	.35	.44	.50	.01	.01	.05	0.14	1.66	12.14**
	1. Personal goal		1	.04	.10	.11	.04	.10	.11	4.78*	14.80***	16.30***
	2. Strategy		2	.04	.12	.15	.01	.02	.04	1.00	2.60	6.45**
	3. Personal goal \times strategy		3	.05	.12	.17	.01	.01	.02	0.58	0.56	2.42
	1. Strategy		1	.01	.01	.04	.01	.01	.04	1.89	1.00	5.44*
	2. Personal goal		2	.04	.12	.15	.03	.11	.11	3.85*	16.46***	17.30***
	3. Strategy \times personal goal		3	.05	.12	.17	.01	.01	.02	0.58	0.56	2.42

^a N = 132. Time 1 was decision periods 1, 2, and 3; time 2 was decision periods 4, 5, 6, and 7; time 3 was decision periods 8, 9, and 10.

^b "Personal goal" represents goal difficulty and "strategy" represents the volume strategy.

† $p < .10$

* $p < .05$

** $p < .01$

*** $p < .001$

with participants having strategy scores above the median ($N = 66$, $r = .69$, $p < .01$, times 2 and 3) versus when a low level of strategy is used with participants having strategy scores below the median ($N = 66$, $r = .27$, $p < .05$, time 2, and $r = -.22$, $p < .10$, time 3). Clearly, the goal-performance correlations are higher for those students most frequently using the volume strategy during times 2 and 3. The value of z is significant for the sales performance factor for both times 2 and 3 (2.36 and 5.31, $p < .01$). In line with the regression results in Table 3, the strongest effect is for time 3 for sales.

Hypothesis 4a predicted a significant relationship between strategy and performance. Both the first-order correlations in Table 2 and the regression coefficients in Table 3 clearly support this prediction. Hypothesis 4b asserts that the volume strategy effect on performance will be stronger than the personal goal effect on performance for this complex task. The data in Table 2 appear to support this prediction. Use of the volume strategy correlated highly with sales performance (r 's = .59, .62, and .63, $p < .001$, times 1, 2, and 3). In contrast, the personal goal-sales performance relationship was weaker (r 's = .23, .30, and .23, $p < .01-.001$). We directly tested the significance of the difference between the strategy-performance and goal-performance correlations, finding significant differences in all three time periods (t 's = 4.02, 3.52, and 4.35, $p < .01$, $df = 129$). Thus, results supported Hypothesis 4b.

CONCLUSIONS

This research has provided several findings of interest with respect to complex tasks. First, the setting of challenging personal goals is positively related to performance. Second, the setting of challenging personal goals is positively, though weakly, related to the degree of use of an effective strategy. Third, strategy moderates the goal-performance relationship, with this relationship being stronger when an effective strategy is used. Fourth, strategy is positively related to performance. Finally, the effect of strategy on performance is stronger than the effect of goals on performance.

This was the first goal-setting study to examine both the effects of goals and of macro-level strategies. The findings support recent studies by Smith and colleagues (1990) and Wood and Bandura (1989) that found specific challenging goals to be positively related to performance on complex tasks. This finding differs from those of some other studies of goal setting and complex tasks (e.g., Earley, Connolly, & Ekøgren, 1989; Huber, 1985) in which the hard goals did not lead to higher performance. However, our finding is not inconsistent with these studies because their authors suggested that the quality of the strategy used influenced the effect of goals on complex tasks.

It might be argued that the task used in this experiment was not actually very complex in that it was obvious how, for example, to increase sales.

However, it should be noted that the strategy factor actually comprised about 14 different activities (see Table 1) that subjects had to choose from among 63 different possibilities during each of 10 decision periods. Further, sales was only one of the seven outcome variables that subjects were trying to influence. Finally, the income factor, which comprised six of the seven outcome measures, was related to goal but had no clear association with any of our measured strategies except for an inverse relationship with use of the focus strategy. However, had the focus strategy been a more successful one, it would likely have been positively related to income since it was the opposite of the volume strategy, the most successful strategy in this simulation. According to Miles and Snow (1978), Porter (1980), and Galbraith and Schendel (1983), focus or niche strategies are more related to performance measured in terms of income than in terms of sales.

We also found a delay before goals affected performance; this delay is not evident from Table 2. The correlational analysis for each of the ten decision periods revealed that the goal effect did not peak until the third to fifth week. This finding supports Campbell and Ilgen's (1976) contentions that during the early phases of highly complex tasks, people may be involved in a learning process and must partly master the task before goal-setting effects occur. These results also concur with studies using complex and multiple tasks (Shaw, 1984; Smith et al., 1990) in which goals and strategies have had significant effects on performance only during later trials. In contrast, there has been extensive evidence showing that goals affect performance on simple tasks without such delays (Latham & Yukl, 1975; Locke et al., 1981). In fact, Locke (1982) found such goal-setting effects after only one minute. Also, strategy lag effects were revealed in the data over the ten decision periods. During decision period 1, the correlation between use of the volume strategy and performance was .32 ($p < .001$); the correlation then increased fairly steadily, reaching a near peak during decision period 3 with a value of .60 ($p < .001$) and not deviating appreciably from this thereafter, finally peaking in decision period 10 at the end of the simulation ($r = .62$, $p < .001$). This pattern indicates that it takes a certain amount of time to develop and implement a strategy. Also recall that the strategy data revealed that clearly identifiable strategies did not develop during the early part of the simulation; there was no clear factor structure for time 1, which represents decision periods one, two, and three.

As would be expected, personal goals affected performance more strongly than assigned goals, which were not related to personal goals or performance. It could be argued that personal goals were simply a rationalization of performance rather than a cause. However, numerous goal-setting studies have established the causal efficacy of goals, including personal goals (Locke & Latham, 1990). Research by Hannan (1975) and Mento, Cartledge, and Locke (1980) has indicated that personal goals predict performance better than assigned goals. Furthermore, Locke and Shaw (1984) found that goals measured before performance got the same results as goals

measured after performance. The results of this study are consistent with Locke's (1968) goal-setting theory, which states that specific and difficult goals will lead to higher levels of performance if individuals accept these goals.

Setting challenging goals was also associated, albeit weakly, with selection of effective strategies and rejection of ineffective ones. This finding concurs with the results of Earley and Perry (1987) and Earley, Lee, and Hanson (1990), who found significant correlations between goals and planning; the latter used a planning measure based on Steiner's (1979) typology of strategies. Our finding also agrees with the findings of Smith and colleagues (1990), who used a complex simulation task to demonstrate that challenging goals were positively related to high-quality planning activity (planning is similar to developing an effective strategy).

The results of this research indicate that high levels of appropriate strategy used tend to moderate the goal-performance relationship. This conclusion should be qualified by noting that the interaction was only significant during time 3 (see Table 3). However, because it was precisely during this period that students clearly formulated strategies and brought them to fruition, it might be worthwhile exploring in a future study how the moderator effect gets stronger over time. Goal-performance relationships were significantly higher for subjects making heavy use of the volume strategy than for those using it to a low degree. These results complement Wood, Mento, and Locke's (1987) strong evidence for a moderating effect of task complexity on the goal-performance relationship. The presence of this moderator effect suggests that people who were using suitable market strategies were able to perform in line with their goals, whereas those who used unsuitable strategies were not. In this respect, strategies functioned statistically much like commitment; goals are related more highly to performance when commitment is high than when it is low (Locke & Latham, 1990). Of course, the effect of commitment is due to motivation, whereas the effect of strategy is due to cognition or knowledge.

Both the correlational and the hierarchical regression analyses demonstrated that use of the volume strategy had a greater effect on sales performance than did the personal goal held. No strategy predicted income very well; however, use of the focus strategy did predict it inversely. One reason may be that the early success and momentum of the sales-oriented volume strategy precluded the success of most income-oriented strategies; according to Porter (1980), income strategies require "time to build" before producing results. Another reason why strategy might not have predicted income is that there were other relevant strategies that were game-specific and not measured during the simulation.

Our finding a significantly greater effect for strategies than for goals on sales provides support for the theoretical contentions of Wood, Mento, and Locke (1987) and others (e.g., Campbell, 1984; Wood & Locke, 1990) who have suggested that for complex tasks, the development of strategies may be necessary before a significant goal-performance effect emerges.

There are several reasons to believe that the results of this study have external as well as internal validity. First, the simulation used here included many major decisions found in real organizations and incorporated a highly dynamic task environment that simulated random change. Second, participants were free to make their own decisions. And although the initial conditions of both the simulation and the participants were identical—except for the goals assigned to participants—the firms emerging at the end of the game were different from each other and yet had strategies highly similar to those found in the theoretical literature. We found those similarities using three different measurement approaches. Finally, the goal-setting results should also be generalizable to real organizations. A comprehensive review of numerous organizational behavior and human resource management goal setting studies by Locke (1986) indicates that researchers have obtained the same basic results for studies conducted in the laboratory and the field. Locke based this conclusion on studies in which the tasks were for the most part very simple and had far less fidelity to actual organizational tasks than the simulation in this study. Thus, the results of this study would be even more likely to generalize to real organizations than the results of the studies Locke (1986) reviewed.

The main applied implication of these results is that having effective task (or business) strategies is even more important than having challenging goals for people performing complex tasks. In fact, challenging goals will not have any substantial effects on performance unless the strategies are suitable. It is known that having challenging goals makes it more likely that people will use effective, known strategies. However, what is unknown and in need of deeper study is under what conditions challenging goals will lead to the discovery of effective strategies. In the light of the micro goal-setting literature, Locke and Latham (1990) suggested that good strategies are least likely to occur under the following circumstances: (1) tasks are complex and heuristic, (2) subjects have no prior experience or training, and (3) subjects with specific, hard goals feel pressure to perform well immediately. Therefore, good strategies are most likely to emerge when those contingencies are absent.

REFERENCES

- Campbell, D. J. 1984. The effects of goal-contingent payment on the performance of a complex task. *Personnel Psychology*, 37: 23–40.
- Campbell, D. J., & Ilgen, D. R. 1976. Additive effects of task difficulty and goal setting on subsequent task performance. *Journal of Applied Psychology*, 61: 319–324.
- Dess, G. G., & Davis, P. S. 1984. Porter's (1980) generic strategies as determinants of strategic group membership and organizational performance. *Academy of Management Journal*, 27: 467–488.
- Earley, P. C., Connolly, T., & Lee C. 1988. *Task strategy interventions in goal setting: The importance of search and strategy development*. Unpublished manuscript, Department of Management and Policy, University of Arizona, Tucson.

- Earley, P. C., Connolly, T., & Ekegren, G. 1989. Goals, strategy development and task performance: Some limits on the efficacy of goal setting. *Journal of Applied Psychology*, 74: 24-33.
- Earley, P. C., Lee, C., & Hanson, L. A. 1990. Joint moderating effects of job experience and task component complexity: Relations among goal setting, task strategies, and performance. *Journal of Organizational Behavior*, 11: 3-15.
- Earley, P. C., Lee, C., & Lituchy, T. R. 1989. *Task strategy and judgments in goal setting: The effects of a learning emphasis and training sequence on performance*. Unpublished manuscript, Department of Management and Policy, University of Arizona, Tucson.
- Earley, P. C., Northcraft, G. B., Lee, C., & Lituchy, T. R. 1990. Impact of process and outcome feedback on the relation of goal setting to task performance. *Academy of Management Journal*, 33: 87-105.
- Earley, P. C., & Perry, B. C. 1987. Work plan availability and performance: An assessment of task strategy priming on subsequent task completion. *Organizational Behavior and Human Decision Processes*, 39: 279-302.
- Earley, P. C., Wojnaroski, P., & Prest, W. 1987. Task planning and energy expended: Exploration of how goals influence performance. *Journal of Applied Psychology*, 72: 107-114.
- Edmister, R. O., & Locke, E. A. 1987. The effects of differential goal weights on the performance of a complex financial task. *Personnel Psychology*, 40: 505-517.
- Galbraith, C., & Schendel, D. E. 1983. An empirical analysis of strategy types. *Strategic Management Journal*, 4: 153-173.
- Hambrick, D. C. 1980. Operationalizing the concept of business-level strategy in research. *Academy of Management Review*, 5: 567-575.
- Hannan, R. L. 1975. *The effects of participation in goal setting on goal acceptance and performance: A laboratory experiment*. Unpublished doctoral dissertation, University of Maryland at College Park.
- Hofer, C. W., & Schendel, D. E. 1978. *Strategy formulation: Analytical concepts*. St. Paul: West Publishing Co.
- Huber, V. L. 1985. Effects of task difficulty, goal setting, and strategy on performance of a heuristic task. *Journal of Applied Psychology*, 70: 492-504.
- Kotler, P. 1976. *Marketing management: Analysis planning and control* (3d ed.). Englewood Cliffs, NJ: Prentice-Hall.
- Latham, G. P., & Baldes, J. J. 1975. The "practical significance" of Locke's theory of goal setting. *Journal of Applied Psychology*, 60: 122-124.
- Latham, G. P., Mitchell, T. R., & Dossett, D. L. 1978. Importance of participative goal setting and anticipated rewards on goal difficulty and job performance. *Journal of Applied Psychology*, 63: 163-171.
- Latham, G. P., & Yukl, G. A. 1975. A review of research on the application of goal setting in organizations. *Academy of Management Journal*, 18: 824-845.
- Locke, E. A. 1968. Toward a theory of task motivation and incentives. *Organizational Behavior and Human Performance*, 3: 157-189.
- Locke, E. A. 1982. Relation of goal level performance with a short work period and multiple goal levels. *Journal of Applied Psychology*, 67: 512-514.
- Locke, E. A. 1986. *Generalizing from laboratory to field settings*. Lexington, MA: Lexington Books.
- Locke, E. A., & Latham, G. P. 1990. *A theory of goal setting and task performance*. Englewood Cliffs, NJ: Prentice-Hall.
- Locke, E. A., & Shaw, K. N. 1984. Atkinson's inverse-U curve and the missing cognitive variables. *Psychological Reports*, 55: 403-412.

- Locke, E. A., Shaw, K. N., Saari, L. M., & Latham, G. P. 1981. Goal setting and task performance: 1969–1980. *Psychological Bulletin*, 90: 125–152.
- Locke, E. A., & Somers, R. L. 1987. The effects of goal emphasis on a complex task. *Journal of Management Studies*, 24: 405–411.
- Mento, A. J., Cartledge, N. D., & Locke, E. A. 1980. Maryland vs. Michigan vs. Minnesota: Another look at the relationship of expectancy and goal difficulty to task performance. *Organizational Behavior and Human Performance*, 25: 419–440.
- Mento, A. J., Steel, R. P., & Karren, R. J. 1987. A meta-analytic study of the effects of goal setting on task performance: 1966–1984. *Organizational Behavior and Human Decision Processes*, 39: 52–83.
- Miles, R. E., & Snow, C. C. 1978. *Organizational strategy, structure, and process*. New York: McGraw-Hill Book Co.
- Miles, R. E., Snow, C. C., Meyer, A. D., & Colman, H. J., Jr., 1978. Organizational strategy, structure, and process. *Academy of Management Review*, 3: 546–562.
- Paine, F. T., & Anderson, C. R. 1983. *Strategic management*. New York: Dryden Press.
- Porter, M. E. 1980. *Competitive strategy, techniques for analyzing industries and competitors*. New York: Free Press.
- Robinson, R. B., Jr., & Pearce, J. A. II. 1988. Planned patterns of strategic behavior and their relationship to business-unit performance. *Strategic Management Journal*, 9: 43–60.
- Scott, C. R., & Strickland, A. J. 1980. *Tempomatic IV: A management simulation* (2d ed.). Boston: Houghton Mifflin.
- Shaw, K. N. 1984. *A laboratory investigation of the relationships among goals, strategies, and task performance*. Unpublished doctoral dissertation, University of Maryland at College Park.
- Smith, K. G., Locke, E. A., & Barry, D. 1990. Goal setting, planning and organizational performance: An experimental simulation. *Organizational Performance and Human Decision Processes*, 46: 118–134.
- Steiner, G. A. 1979. Contingency theories of strategy and strategic management. In D. E. Schendel & C. W. Hofer (Eds.), *Strategic management: A new view of business policy and planning*: 405–416. Boston: Little, Brown & Co.
- Taylor, M. S., Locke, E. A., Lee, C., & Gist, M. E. 1984. Type A behavior and faculty research productivity: What are the mechanisms? *Organizational Behavior and Human Performance*, 34: 402–418.
- Terborg, J. R. 1976. The motivational components of goal setting. *Journal of Applied Psychology*, 61: 613–621.
- Tubbs, M. E. 1986. Goal setting: A meta-analytic examination of the empirical evidence. *Journal of Applied Psychology*, 71: 474–483.
- Venkatraman, N., & Grant, J. H. 1986. Construct measurement in organizational strategy research: A critique and proposal. *Academy of Management Review*, 11: 71–87.
- Wood, R. E. 1986. Task complexity: Definition of the construct. *Organizational Behavior and Human Decision Processes*, 37: 60–82.
- Wood, R. E., & Bandura, A. 1989. Social cognitive theory of organizational management. *Academy of Management Review*, 14: 361–384.
- Wood, R. E., & Locke, E. A. 1990. Goal setting and strategy effects on complex tasks. In B. M. Staw & L. L. Cummings (Eds.), *Research in organizational behavior*, vol. 12: 73–109. Greenwich, CT: JAI Press.
- Wood, R. E., Mento, A. J., & Locke, E. A. 1987. Task complexity as a moderator of goal effects: A meta-analysis. *Journal of Applied Psychology*, 72: 416–425.

APPENDIX

Goal Questionnaire

Subjects circled one response for items with multiple possibilities.

1. Tell me what your personal goal was to be:
(a) number 1 or 2 in my industry, (b) number 3 or 4 in my industry, (c) number 5 or 6 in my industry, (d) number 7 or 8 in my industry, (e) none of these. Explain.
2. Tell me what your personal goal was:
(a) to do my best, (b) to do reasonably well, (c) to just get by, (d) none of these. Explain.
3. Was your personal goal to improve over the first half of the game?
(a) yes, (b) maybe, (c) no. If yes, state what your personal goal was for the rest of the game.
4. Did you change your assigned goal during the course of the game? Explain.
5. Did your performance in the game cause you to change your goal?
(a) yes, (b) maybe, (c) no. If yes, explain why.

Amelia A. Chesney received her Ph.D. degree from the University of Maryland at College Park. She is an assistant professor of strategic management and international business at the Georgia Institute of Technology. Her research interests are competitive business strategies and international strategic planning.

Edwin A. Locke received his Ph.D. degree from Cornell University. He is a professor in and the chairman of the management and organizational behavior faculty at the University of Maryland at College Park. His current research interests include work morale and motivation.

RESEARCH NOTES

© *Academy of Management Journal*
1991, Vol. 34, No. 2, 425-435.

EFFECTS OF WORK REDESIGN ON EMPLOYEE PERCEPTIONS, ATTITUDES, AND BEHAVIORS: A LONG-TERM INVESTIGATION

RICKY W. GRIFFIN
Texas A&M University

This study investigated the long-term effects of work redesign on a number of perceptual, attitudinal, and behavioral variables. For the experimental group, 526 bank tellers, attitudinal variables initially improved, but then declined to previous levels. Performance showed no change after 6 months but significant improvements after 24 and 48 months.

Organizational research concerning work redesign has been of considerable interest to scholars over the past three decades. The focus of this research has been on how various kinds of task configurations affect key employee attitudes and behaviors. The purpose of this study was to assess such effects over an extended time period.

LITERATURE REVIEW

The work of Hackman and his associates stimulated current interest in work redesign (Hackman & Lawler, 1971; Hackman & Oldham, 1976, 1980). Drawing from earlier work by Turner and Lawrence (1965), Hackman argued that the motivating potential of jobs can be best represented by a number of task dimensions. The dimensions most commonly described are task variety, autonomy, feedback, identity, and significance. The presumption is that if a job has relatively high levels of these attributes, its motivating potential is greater than that of a job that has relatively low levels of the attributes.

Although others have advanced alternative theoretical formulations (cf. Salancik & Pfeffer, 1978), Hackman's basic theoretical framework has not been refuted. And even though the potential role of individual differences has fallen to a position of secondary interest, the general approach of relating task perceptions to outcome variables is still a common method of studying tasks (e.g., Idaszak & Drasgow, 1987; Gerhart, 1988).

Indeed, the extant research in this area has found fairly consistent support for a link between task perceptions and attitudes (cf. Griffin, 1982a). On the other hand, the link between task perceptions and performance is less clear-cut (Griffin, Welsh, & Moorhead, 1981). In some instances, for example, task perceptions have been unrelated to performance (e.g., Hackman &

Oldham, 1976). In other cases, though, significant relationships have been found (e.g., Griffin, 1982b). The research related to task perceptions and employee reactions has been conducted in a variety of settings. Authors have reported several laboratory studies (e.g., Umstot, Bell, & Mitchell, 1976), but cross-sectional field surveys have been most prevalent (e.g., Hackman & Oldham, 1976). A few field experiments and longitudinal field surveys have also been reported (e.g., Griffin, 1983; Orpen, 1979).

The field experiments have provided fairly clear and consistent evidence for the effects of work redesign. In particular, the studies have shown that employees perceive changes that have been made in their jobs and express higher levels of motivation, satisfaction, or both. As noted above, though, they do not always perform better. The time periods for these studies have been relatively short, however. Griffin's (1983) field experiment spanned four months, and Orpen's (1979) study spanned six months. Other longitudinal studies of task attributes' relationships have covered periods of three months (Griffin, 1981) and six months (Lawler, Hackman, & Kaufman, 1973). At least one published long-term study focused on autonomous work groups (Wall, Kemp, Jackson, & Clegg, 1986). However, that study did not include individual measures of task perceptions. Thus, an obvious unanswered question is the extent to which patterns of interrelationships among central work design variables are stable or unstable over long periods. Given that there is no clear reason to expect all outcomes to manifest themselves at the same time, it follows logically that by assessing them over an extended period of time researchers may learn more about causal patterns among the key variables. This study was designed to address this gap in the research literature by examining the effects of job changes on employee attitudes and behaviors over intervals of 6, 24, and 48 months.

METHODS

Site and Respondents

The research was conducted in the 1980s at the 38 member banks of a large Southwestern bank holding corporation. The corporation asked that specific dates be excluded from this article in order to help preserve its anonymity. In one recent year, the corporation had total revenues of about \$2.4 billion and profits of about \$175 million. The member banks were located in seven metropolitan areas. The potential respondents for the study were the approximately 1,000 bank tellers working at the 38 banks, 85 percent of whom were women. The tellers had an average age of 26.5 years; 98 percent held high school diplomas, but only 3 percent had college degrees. Their average experience with the bank corporation was slightly less than four years at the time the study was undertaken.

Procedures

Job change intervention. During a fall in the 1980s and the following spring, the bank corporation's management decided to implement an on-line

computer network to expedite functions tellers had performed manually and enrich the teller job simultaneously. The purpose of the enrichment intervention was to make the job more professional and intrinsically rewarding through the enhancement of responsibility, authority, and accountability. Two events prompted the intervention. An interview study conducted the previous spring by the corporation's human resource staff had indicated considerable dissatisfaction among tellers about their jobs. Participants had indicated that they felt they were not part of the "team" and were nothing more than "glorified clerks" and that they had to check with their supervisors too often on minor decisions. They also felt the job was boring.

At the same time, a report from an operations task force strongly recommended that the teller function become more integrated into the overall organization system via an automated information network. The new system was supposed to decrease errors and increase the speed at which changes in customer accounts were posted. Management decided to accept the operations task force recommendation and recognized that the job changes accompanying implementation of the new system would be a good opportunity to change the nature of the teller job itself. In particular, several changes were planned and targeted to increase responsibility, authority, and accountability. First, tellers would have a wider range of activities than before. Previously, they cashed checks and accepted deposits and loan payments, referring commercial and travelers check customers to special tellers. Under the new system, each teller was trained in all functions and could carry out all related transactions. Under the old system, tellers held documents on deposits and withdrawals in a tray until the documents were collected and taken to another work room, where bookkeeping employees posted them. Under the new system, each teller had an on-line computer terminal. Deposits, payments, and withdrawals were posted immediately and verified later by bookkeeping. Tellers also received more autonomy over routine decisions. Previously, they needed a supervisor's signature for immediate crediting of all deposits and for withdrawals of greater than \$100. After the job changes, tellers could post local checks immediately and perform withdrawals as long as the information system indicated there were adequate funds in a withdrawer's account. Several other similar routine decisions were also formally delegated to the tellers.

Feedback was also enhanced. Under the old system, errors were not reported back to the tellers until the end of the day or, in some cases, the next morning. The automated system allowed bookkeeping to transmit error messages as soon as errors were discovered. The system also recorded the cumulative numbers of customers and transactions each teller handled each day and displayed these figures at all times on the teller's monitor. Thus, tellers could monitor their own work pace at all times. Finally, a closer link between tellers and customers was established. The receipt for each transaction was changed to include a special message at the bottom giving the name of the teller who had performed the transaction and inviting the cus-

tomers to contact the teller first in the event of an error or question. The teller could then handle the question or inquiry alone or refer it to someone more appropriate.

Measurement strategy. Implementation of the changes was planned to occur during the spring and early summer of the same year in which management had decided on the job changes. The corporation bought a computer network from a large computer systems vendor and had it installed by the vendor's own personnel. Meanwhile, corporate management decided to exclude one bank from the intervention. No reason was given at the time, although I later learned that the corporation had decided to sell this bank. There were no other banks belonging to the holding corporation in the excluded bank's community. None of its operating employees were aware of the job changes being planned for the other banks, nor were they aware of the planned sale. Thus, we retained the employees at this bank in the study for comparison purposes.

Tellers were contacted in May and asked to participate in a survey to assess their attitudes toward and perceptions of their jobs. At that time, the total number of tellers at the banks where changes were planned was 1,047, and there were another 48 tellers at the comparison bank. The tellers were aware that some job changes were forthcoming but had no idea of the magnitude or nature of those changes. That is, they had been informed about the anticipated computerization of their tasks but were unaware that actual task procedures were going to be changed simultaneously. All tellers completed the questionnaires in groups in bank conference rooms. Human resource employees from their own banks administered the questionnaires to all tellers. These administrators explained the general purpose of the study to the tellers; at the comparison bank, tellers were told that the study was simply an attitude survey. They were asked to identify themselves by payroll number and had the option of dropping out of the study at any time. A total of 124 employees chose not to participate, or did not identify themselves, or else provided unusable responses. Thus, for this questionnaire administration, time 1, there were 923 usable responses. At the comparison bank, 45 tellers participated.

It took approximately two months to install the new system, train all employees in its use, and work out the bugs. Bank officials indicated by early September of the year of installation that the new system was in place and functioning fairly smoothly. Thus, I defined September as the time at which the intervention was complete. Six months later, in early March, all employees were surveyed again. The procedure for data collection was the same as at time 1. A total of 861 employees from the time 1 set completed the time 2 measures. At the comparison site, 43 tellers participated. The attrition was caused by turnover, additional people choosing not to participate, and respondents not identifying themselves. The time 3 measure was taken 24 months after the completion of the intervention, in September of the second year after implementation of the changes. The total number of carry-over respondents at time 3 was 790 at the experimental sites and 38 at the com-

parison site. Again, turnover, dropouts, and lack of identification caused the attrition. Finally, at the 48-month mark, final measures were taken (time 4). A total of 526 tellers were still in the set of respondents. Meanwhile, the comparison bank had been sold and its employees were unavailable for continued participation.

The data reported here are based on the 526 tellers who identified themselves and participated all four times, plus the 38 tellers at the comparison bank who participated the first three times. Employees who joined the bank after we took the initial measures participated in the later surveys, but I deleted their responses from the final data. The measurement times providing data for inspection were thus preintervention, 6 months, 24 months, and 48 months, with no comparison data at the 48-month mark.

Measures

A total of six perceptual, attitudinal, and behavioral variables were measured: task perceptions, job satisfaction, organizational commitment, performance, absenteeism, and propensity to quit ("turnover propensity").

Task perceptions. Task perceptions were measured with the Job Diagnostic Survey (JDS; Hackman & Oldham, 1975). The JDS, which measures task variety, autonomy, feedback, significance, and identity, is the most widely used instrument in task design research and has known and generally acceptable psychometric properties. Factor analyses of the data yielded a five-factor solution virtually identical to the *a priori* scales. Thus, following the guidelines provided by Hackman and Oldham (1975), I combined the scales into an overall motivating potential score, or MPS.

Job satisfaction. Job satisfaction was measured with the short form of the Minnesota Satisfaction Questionnaire (MSQ; Weiss, Davis, England, & Lofquist, 1967). Previous research has shown the 20 items in the MSQ to have acceptable levels of reliability and validity across a variety of settings (Cook, Hepworth, Wall, & Warr, 1981). Responses are on five-point scales anchored by "strongly agree" and "strongly disagree."

Organizational commitment. Organizational commitment was measured with the 15-item scale developed by Porter, Steers, Mowday, and Boulian (1974). Responses to items are on seven-point scales ranging from "strongly agree" to "strongly disagree." Again, the instrument has well-documented psychometric properties (Cook et al., 1981).

Performance. Performance was assessed via supervisory evaluations on a three-item scale. One item pertained to performance quality, one to performance quantity, and the third to overall performance. For example, the quality item was "This teller has consistently done high-quality work over the last six months." The five-point response scales ranged from "strongly agree" to "strongly disagree." I combined the three items to obtain an overall performance index. The evaluations for each teller were obtained at times corresponding to the administration of the survey questionnaires. Of the tellers in the final set, 81 percent were evaluated by the same individual across all time points.

Absenteeism. Measures were obtained from bank records, with absenteeism defined as the number of days a teller had been absent from work during the six months immediately preceding each measurement point. Holidays and time charged against annual leave (i.e., vacations) were not counted.

Propensity to quit. Finally, propensity to leave the organization was measured by the three-item "turnover propensity" scale developed by Seashore, Lawler, Mirvis, and Cammann (1982). Responses to each item are on a seven-point scale.

RESULTS

Variable intercorrelations across all four time points, shown in Table 1, followed a fairly clear pattern. Questionnaire-based measures from single administrations were moderately intercorrelated, most likely as a result of a combination of construct interdependence and common method variance. Correlations between variables measured across time points were smaller. Absenteeism and propensity to quit were correlated less frequently with other variables than with each other, although the significant correlations that did emerge tended to be in the appropriate direction—negative. Perhaps the most interesting correlational results pertained to performance. Performance was not significantly correlated with any of the other variables at any single time point, although the time 3 and 4 measures of performance did have small but significant correlations with the time 1 and time 2 motivating potential scores.

Two different analytic procedures were used. Under ideal circumstances, a repeated-measures multivariate analysis of variance (MANOVA) design assessing mean differences between the experimental and comparison groups would have been the primary approach. However, given the large differences in the sizes of the two groups (526 versus 38) and the lack of comparison group data at time 4, it was actually more instructive to employ a repeated-measures MANOVA design assessing within-group changes over time. The latter design is discussed first.

The repeated-measures MANOVA of the experimental group resulted in an F -value of 14.25, significant beyond the .001 level. The corresponding F for the comparison group was 1.34, which was nonsignificant. Table 2 summarizes the results of the follow-up univariate F -tests, along with all variable means and standard deviations. There are significant differences across time periods between the motivating potential score, satisfaction, commitment, and performance values within the experimental group but not within the comparison group. Differences in values for absenteeism and propensity to quit were not significant for either group.

Table 2 also summarizes the results of Duncan's multiple range tests conducted for each pair of means to ascertain more precisely where differences existed. Means that share a common solid underline in the table were

TABLE 1
Variable Intercorrelations^a

Variables	Time 1						Time 2						Time 3						Time 4					
	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6
Time 1																								
1. Motivating potential score (.82)																								
2. Job satisfaction .24 (.76)																								
3. Organizational commitment .19 .28 (.91)																								
4. Performance .08 .04 .03 (.91)																								
5. Absenteeism .06 -.10 -.08 -.06																								
6. Propensity to quit -.08 -.09 -.16 -.09 .16 (.87)																								
Time 2																								
1. Motivating potential score .71 .18 .11 .06 -.04 .03 (.88)																								
2. Job satisfaction .28 .69 .16 .04 .01 -.06 .26 (.90)																								
3. Organizational commitment .19 .42 .76 .04 .07 .10 .24 .31 (.89)																								
4. Performance .08 .04 -.03 .85 -.02 .04 .08 .04 -.03 (.93)																								
5. Absenteeism -.06 .06 .06 -.09 .89 .17 .07 -.14 -.04 -.09																								
6. Propensity to quit -.04 -.02 -.10 -.06 .14 .78 -.06 -.12 -.18 -.06 .13 (.93)																								
Time 3																								
1. Motivating potential score .58 .12 .02 .01 .06 -.04 .70 .14 .11 -.02 .03 (.84)																								
2. Job satisfaction .14 .49 .13 .06 .01 -.06 .12 .61 .10 .06 -.06 .01 .31 (.84)																								
3. Organizational commitment .12 .12 .67 -.07 .09 .02 .14 .13 .74 .03 .05 -.07 .25 .30 (.86)																								
4. Performance .18 .08 -.06 .38 .08 -.03 .21 -.02 .05 .53 .08 .03 -.04 .06 .05 (.90)																								
5. Absenteeism .03 -.06 -.02 .05 .76 .16 .06 .09 -.08 .08 .84 .18 -.03 -.10 -.14 -.07																								
6. Propensity to quit .05 .01 .08 .06 .12 .64 -.04 -.14 .05 -.09 -.02 .63 -.01 -.14 -.14 .02 .14 (.90)																								
Time 4																								
1. Motivating potential score .51 .15 .09 .03 .04 -.01 .62 .13 .10 .01 -.08 -.02 .58 .18 .10 .09 -.06 -.04 (.86)																								
2. Job satisfaction .16 .53 .12 .09 .03 -.08 .10 .59 .06 .08 -.02 .04 .14 .68 .08 .05 -.08 .03 .34 (.88)																								
3. Organizational commitment .13 .21 .71 .03 .04 .07 .13 .13 .70 -.03 -.06 -.08 .12 .19 .63 .05 .10 -.08 .18 .26 (.81)																								
4. Performance .20 .06 -.04 .42 .09 .04 .19 -.03 -.04 .58 .06 .04 .08 .03 .08 .58 .09 .08 -.08 .07 (.93)																								
5. Absenteeism .01 -.03 .04 .03 .68 .13 .05 .07 -.06 -.01 .71 .17 .04 .07 .01 .07 .62 .16 -.01 -.12 .06 .03																								
6. Propensity to quit -.06 -.09 .03 .08 .03 .70 -.06 -.18 .05 -.10 -.04 .62 -.04 -.13 .09 -.04 -.10 .70 .03 -.06 -.05 .05 .01 (.82)																								

^a Reliabilities are on the diagonal, in parentheses. Values of $r > .12$ are significant at $p < .01$.

TABLE 2
Means, Standard Deviations, and Univariate F s^{a,b}

Variables	Time 1		Time 2		Time 3		Time 4		Effect Sizes
	Means	s.d.	Means	s.d.	Means	s.d.	Means	s.d.	
Motivating potential score									
Experimental group	107.62	41.26	142.44	52.08	140.91	54.91	136.72	52.66	30.64***
Comparison group	121.42	36.19	123.10	32.94	120.23	36.45			3.91
Job satisfaction									
Experimental group	2.95	1.26	3.88	1.31	3.01	1.14	2.99	1.70	23.48***
Comparison group	3.16	1.04	3.21	0.98	3.05	1.17			2.43
Organizational commitment									
Experimental group	4.07	1.38	4.91	1.62	4.15	1.41	4.10	1.52	9.83**
Comparison group	5.26	1.46	5.60	1.39	5.47	1.17			4.90
Performance									
Experimental group	3.11	0.96	3.08	0.87	3.87	0.91	3.96	0.92	12.86**
Comparison group	3.04	0.76	3.10	0.82	3.08	0.90			3.74
Absenteeism									
Experimental group	2.46	0.72	2.51	0.64	2.43	0.80	2.49	0.78	3.46
Comparison group	1.92	0.62	2.03	0.80	1.96	0.72			3.08
Propensity to quit									
Experimental group	3.72	1.19	3.65	1.27	3.78	1.31	3.59	1.44	5.22
Comparison group	3.31	0.92	3.26	0.80	3.24	0.76			3.64

^a For the experimental group, $N = 526$; for the comparison group, $N = 38$. No time 4 data for the comparison group were available.

^b Means with a common solid underline are significantly different beyond the .01 level.

** $p < .01$

*** $p < .001$

found to be different beyond the .01 level of significance. When these results are related back to the mean values, clear patterns of change emerge. Motivating potential score values, for example, increased significantly from time 1 to time 2 and held fairly constant at times 3 and 4. Thus, people evidently perceived the changes in their jobs, and these perceptions did not diminish over the 48-month period.

Job satisfaction followed a different pattern, increasing significantly from time 1 to time 2 but dropping by time 3 to a level not significantly different from its time 1 level and not changing significantly at time 4. Commitment followed the same path as satisfaction, increasing first and then decreasing back to its original level.

The performance scores followed still a different path. These values did not change significantly from time 1 to time 2 but did increase significantly from time 2 to time 3, remaining at the higher level at time 4. Thus, there were clearly identifiable patterns inherent in the dependent variable changes over the three time periods, although there were also three unique patterns.

Finally, the last column of Table 2 displays effect sizes for each variable. Effect sizes for the comparison group were all quite small. Likewise, effect sizes for absenteeism and propensity to quit were also small for the experimental group. Effect sizes were substantial for both the motivating potential score and satisfaction for the experimental group. Commitment and performance reflected moderate effect sizes in the experimental group (Cohen, 1988). Thus, the observed results are generally consistent and clear.

As noted earlier, I also employed a repeated-measures MANOVA design assessing mean differences between the two groups. With a significant F -value of 16.37 ($p < .001$), the results of these analyses were consistent with those explained above. There were a few scattered between-group differences that significantly varied (for example, time 1 motivating potential score values were significantly different beyond the .05 level), but in general, the between-group differences paralleled the within-group changes. For example, performance was not significantly different at time 1 or time 2, but it was at time 3 ($p < .01$). Given the disparate numbers of respondents, however, these results should be seen only as a supplement to those of the primary analyses.

DISCUSSION

An interesting pattern of results emerged from this study, a pattern that holds clear implications for practicing managers and task design scholars. First, the task redesign intervention significantly altered employee perceptions in the predicted and desired directions. Moreover, the altered perceptions remained at their new level for the duration of the study. Second, attitudes (satisfaction and commitment) also increased quickly but then diminished back to their initial levels. Finally, performance did not increase initially, but did increase significantly by the end of the study period.

These findings suggest the critical importance of looking at patterns of change over extended periods of time and of obtaining multiple measures of key variables. For example, if this study had taken measures at time 1 and time 2 only, I would have inferred that task redesign strongly enhances perceptions and attitudes, but not performance. Alternatively, a study based solely on time 1 and time 3 data would suggest that task redesign enhances perceptions but not attitudes or performance. Finally, a time 1 and time 4 study would suggest that task redesign enhances perceptions and performance but not attitudes. Only by obtaining multiple measures over an extended period of time was I able to detect the array of changes and relationships summarized above.

Of course, it is also important to recognize the limitations of the study. For one thing, the small size of the comparison group and its unavailability at time 4 limit the strength of the study. A power analysis indicated statistical power of .82, a reasonable but not particularly robust level. Thus, the comparison group results provide some reasonable insights but must be evaluated quite conservatively.

Similarly, the lack of control over other events in banks limits inferences regarding the performance changes. As Hackman and Oldham (1980) noted, several different things can enhance performance. One explanation for the present results could be that enhanced employee motivation resulting from the work redesign changes increased performance. Another explanation could be simply that the changes eliminated various inefficiencies in the old work system. A Hawthorne effect could also have induced some of the changes observed.

Still, useful implications can be drawn from the present results. For theorists, a key message is that they need to do a better job of incorporating time into causal models and theories. A major theme of organizational science is the search for reliable relationships among various independent variables and particular dependent variables. At the same time, there is no reason to assume that, if a change in a given independent variable does in fact influence a set of dependent variables, those changes will manifest themselves at a given time. For empirical researchers, perhaps the most important finding from this study was the differential pattern of changes across time periods. Researchers need to be more sensitive to the nature of perceptual, attitudinal, and behavioral variables. Independent variables likely exert differential effects on different kinds of dependent variables. Thus, research needs to be designed to account for and better capture nuances in causal relationships, particularly when those nuances pertain to varying causal intervals.

For managers, perhaps the key message relates to the role of work redesign as a change intervention. The findings reported here underscore the need to retain work redesign as a viable tool for enhancing employees' work experiences. Numerous benefits can accrue to both employees and organizations.

REFERENCES

- Cohen, J. 1988. *Statistical power analysis for the behavioral sciences* (2d ed.). Hillsdale, NJ: Lawrence Erlbaum Associates.
- Cook, J. D., Hepworth, S. J., Wall, T. D., & Warr, P. B. 1981. *The experience of work*. London: Academic Press.
- Gerhart, B. 1988. Sources of variance in incumbent perceptions of job complexity. *Journal of Applied Psychology*, 73: 154–162.
- Griffin, R. W. 1981. A longitudinal investigation of task characteristics relationships. *Academy of Management Journal*, 24: 99–113.
- Griffin, R. W. 1982a. *Task design—An integrative approach*. Glenview, IL: Scott, Foresman.
- Griffin, R. W. 1982b. Perceived task characteristics and employee productivity and satisfaction. *Human Relations*, 35: 927–938.
- Griffin, R. W. 1983. Objective and social sources of information in task redesign: A field experiment. *Administrative Science Quarterly*, 28: 184–200.
- Griffin, R. W., Welsh, M. A., & Moorhead, G. 1981. Perceived task characteristics and employee performance: A literature review. *Academy of Management Review*, 6: 655–664.
- Hackman, J. R., & Lawler, E. E., III. 1971. Employee reactions to job characteristics. *Journal of Applied Psychology*, 55: 259–286.
- Hackman, J. R., & Oldham, G. 1975. Development of the Job Diagnostic Survey. *Journal of Applied Psychology*, 60: 159–170.
- Hackman, J. R., & Oldham, G. 1976. Motivation through the design of work: Test of a theory. *Organizational Behavior and Human Performance*, 16: 250–279.
- Hackman, J. R., & Oldham, G. 1980. *Work redesign*. Reading, MA: Addison-Wesley.
- Idaszak, J. R., & Drasgow, F. 1987. A revision of the Job Diagnostic Survey: Elimination of a measurement artifact. *Journal of Applied Psychology*, 72: 69–74.
- Lawler, E. E., III, Hackman, J. R., & Kaufman, S. 1973. Effects of job redesign: A field experiment. *Journal of Applied Social Psychology*, 3: 49–62.
- Orpen, C. 1979. The effects of job enrichment on employee satisfaction, motivation, and performance: A field experiment. *Human Relations*, 32: 189–217.
- Porter, L. W., Steers, R. M., Mowday, R. T., & Boulian, P. V. 1974. Organizational commitment, job satisfaction, and turnover among psychiatric technicians. *Journal of Applied Psychology*, 69: 603–609.
- Salancik, G., & Pfeffer, J. 1978. A social information processing approach to job attitudes and task design. *Administrative Science Quarterly*, 23: 224–253.
- Seashore, S. E., Lawler, E. E., III, Mirvis, P., & Cammann, C. 1982. *Observing and measuring organizational change: A guide to field practice*. New York: Wiley.
- Turner, A. N., & Lawrence, P. R. 1965. *Industrial jobs and the worker*. Boston: Harvard Graduate School of Business Administration.
- Umstot, D. D., Bell, C. H., & Mitchell, T. R. 1976. Effects of job enrichment and task goals on satisfaction and productivity: Implications for job design. *Journal of Applied Psychology*, 61: 379–394.
- Wall, T. D., Kemp, N. J., Jackson, P. R., & Clegg, C. W. 1986. Outcomes of autonomous work-groups: A long-term field experiment. *Academy of Management Journal*, 29: 280–304.
- Weiss, D. J., Davis, R. V., England, G. W., & Lofquist, L. H. 1967. *Manual for the Minnesota Satisfaction Questionnaire*. Minneapolis: University of Minnesota.

Ricky W. Griffin is the Lawrence E. Fouraker Professor of Business Administration and Professor of Management at Texas A&M University. He received his Ph.D. degree from the University of Houston in 1978. His research interests include work design, organizational creativity, and the determinants of managerial success in organizations.

GAINS IN VERTICAL ACQUISITIONS AND MARKET POWER: THEORY AND EVIDENCE

SAYAN CHATTERJEE
Case Western Reserve University

This study investigated the factors that can explain the gains resulting from vertical mergers. The findings suggest that acquiring firms gain the most when they come from concentrated markets and target firms come from fragmented markets. The findings also suggest that, on the average, the firms studied increased their market power as a result of mergers.

Three streams of research are relevant to understanding vertical integration. Of these three streams, the treatment of vertical integration in the strategic management literature is the sparsest and most inconsistent. Using the same data base but different performance measures, Rumelt (1974) and Lubatkin and Rogers (1989) reached different conclusions about the performance of dominant vertical firms.¹ Their use of different performance measures may account for the different conclusions of the two studies. Although neither study tried to explain performance, both identified the number of dominant firms operating in adjacent upstream and downstream production stages in a vertical chain as a possible contributor to performance. The number of dominant firms operating in a stage constitutes its market structure.

Market structure—or more correctly, asymmetric market structure—is the primary determinant of vertical integration in industrial organization economics (IO) theories about vertical integration. Typically, IO theories suggest that firms in markets dominated by a few players have an incentive to integrate by moving into adjacent fragmented stages. Classic examples of this type of integration are Alcoa's forward integration in the 1920s, when the firm began producing electric cables, and the backward integration of the major steel producers around 1900, when they entered the fragmented iron ore supply market. More recent examples are Motorola and Intel's forward moves into the minicomputer market. The IO literature, however, sorely

I would like to thank Vasudevan Ramanujam, Michael Lubatkin, Birger Wernerfelt, Srinivasan Balakrishnan, Thomas Turk, Robert Hoskisson, Jan Heide, and two anonymous reviewers for comments. I would also like to thank Timothy Schoenecker for research assistance on this project.

¹ Dominant vertical firms are those whose primary diversification is in adjacent upstream or downstream production stages. See Rumelt (1974) for a definition.

lacks empirical investigation of these theories. The few studies that have attempted to measure vertical integration in terms of the ratio of a firm's sales to value added have been criticized because this measure is sensitive to how far upstream a firm is integrated and may pick up other diversification influences. Further, none of these studies have considered the performance implications of vertical integration.

In the third relevant stream, research on transaction cost economics, vertical integration is treated as a trade-off between contractual and internal exchange (Williamson, 1985). There are some empirical, single-industry studies of transaction cost theories (Masten, 1984; Walker & Weber, 1987), but they have also failed to consider the performance implications of vertical integration.

This study investigated the IO prediction that the market structure of adjacent stages influences performance after a vertical merger. By focusing on clearly vertical mergers, this study avoided the problem of measuring vertical integration. To my knowledge, the only other studies that have looked at the market value implications of vertical mergers are Spiller (1985) and Lubatkin (1987). A problem with both studies, however, is that they estimated performance over long time horizons, thereby possibly introducing bias from other strategic moves. The current study used daily stock prices to focus specifically on particular acquisitions and extended past research by investigating which of the two competing rationales for vertical mergers suggested by the IO theories—market power or efficiency—was predominant. An important limitation of this study, however, is its inability to capture the implications of transaction costs, and the findings have to be interpreted with that limitation in mind.

PREVIOUS RESEARCH AND HYPOTHESES DEVELOPMENT

Market Structure and Gains in Vertical Mergers

The IO theorists have suggested that oligopoly at any stage of production provides an incentive for firms in that stage to integrate into an adjacent competitive stage. A widely proffered IO argument (Bain, 1956; Porter, 1980) suggests that by vertically integrating, an oligopoly can make entry difficult in its market because new entrants have to enter both stages involved. Vertical integration helps to preserve market power in an oligopolist's stage, which facilitates intraindustry collusion, which raises industrywide profits (Eckbo, 1985: 325). Such integration is even more effective with vertical mergers that eliminate a natural potential entrant in each stage. Further, the incentive for vertical integration is higher if the adjacent stages involved are competitive, since the threat of new entry into such markets is greater than the threat of new entry into a concentrated stage.²

² The link between vertical integration by an individual firm and the market power of its stage should be made clear. If there is only one firm, a monopolist, there is, of course, no
(continued)

The IO theorists have also acknowledged that there are incentives for vertical integration under a bilateral monopoly. However, as Spiller pointed out, the gains from a vertical merger are higher "when only one side of the vertical relation has market power. . . . If both sides have market power the neoclassical framework does not provide a standard solution to the bargaining problem. . . . Thus the gains from the merger should be reduced if both sides have market power" (1985: 288). In summary, the IO theories suggest the total gains from vertical mergers are likely to be highest under an asymmetric distribution of market power.

An interesting aspect of the IO theories is that they allow the making of predictions about gains to the acquiring firm as well as about the total gains in a merger. This capability is important because acquiring firms do not typically seem to benefit from mergers (Jensen & Ruback, 1983). The gains that accrue to an acquiring firm will depend on (1) the total gains in a merger, less (2) the merger premium, or the gains to the target firm. An acquiring firm from an oligopoly is likely to have bargaining power over an adjacent competitive stage with multiple target firms, leading to a lower merger premium for the acquisition. Thus, I expected that the gains to an acquiring firm would be highest when its stage has market power and the target firm's stage is competitive. The reverse should be true if the target's stage has market power and the acquiring firm's stage is competitive. Table 1 summarizes the above discussion.

Although Table 1 suggests a direct test of the IO predictions, a caveat strategic management scholars have suggested is worth noting: if entry barriers are low, vertical integration does little to reduce the threat of new entries further, so a firm might as well not integrate. Instead, it can use its market power to decrease input prices or raise output prices and can avoid incurring a reduction in strategic flexibility as a result of integration (Harrigan, 1984; Porter, 1980). If this modification is valid, acquiring firms should gain the most when they come from industries with low entry barriers. My empirical tests of the following two hypotheses testing the predictions summarized in Table 1 should be interpreted in light of the strategic management modification.³

Hypothesis 1: After a merger, the revaluation of the acquiring firm will be high if its production stage has high market power and the target firm is in a relatively competitive industry.

Hypothesis 2: After a merger, the revaluation of the target firm will be high if its production stage has high market power and the acquiring firm is in a competitive industry.

distinction between firm and stage. However, if there is an oligopoly, the market power argument is that all the firms in that stage are trying to maximize their joint profits. Thus, a merger by one firm represents increased entry barriers, which will strengthen the oligopoly's ability to maximize joint profits, thus increasing its collective market power.

³ If entry barriers are already high, no support for the IO predictions is likely to emerge.

TABLE 1
Merger Gains Under Market Power Theories

Gains	Market Power	
	Target Industry Has More	Acquiring Industry Has More
Total gains	High	High
Gains to target firm	High	Low
Gains to acquiring firm	Low	High

The Sources of Gains in Vertical Mergers

In addition to the market power argument explaining vertical integration, a second argument centered on efficiency, or the lowering of costs and final prices, has recently gained acceptance both among economists (e.g., Posner, 1976) and legal scholars (e.g., Bork, 1978). They have argued that vertical mergers often generate important efficiencies, usually present no competitive problems, and should be left alone by antitrust enforcers.

Given the dichotomy in the literature and the clear public policy implications of that argument, it is curious that no empirical study has resolved this theoretical debate. As the statement from Eckbo (1985) given above suggests, collusive behavior by an oligopoly leads to industrywide profits that benefit all the firms in an acquiring firm's stage—either by actual gains in oligopoly profits through collusion or by the reduction of lost profits from potential entrants. If market power is the predominant motive behind vertical integration, gains to an acquiring firm and to the other incumbents in its stage—whom I henceforth refer to as rivals—should be positively correlated. On the other hand, if increased efficiency has motivated the integration, the lowered costs for the acquiring firm implies a negative competitive impact on its rivals. The rival firms, however, can undertake similar mergers to become efficient themselves, and the expectations of such mergers would have a positive effect on their value. Thus, under the efficiency hypothesis, the net effect of a given vertical merger on the value of rival firms is unclear (Chatterjee, 1986: 122–123). In summary, if market power is the predominant motive for a merger, there should be a positive correlation between the gains to the acquiring firm and its rivals, but an efficiency motive should lead to no correlation.

Hypothesis 3: If the capital market judges that a vertical merger was undertaken to increase market power, the change in the value of the rivals of the acquiring firm will be positively correlated with the gains to the acquiring firm.

Controls

Stigler (1951) argued that emerging industries are composed of integrated firms because the level of production at any one production stage is

too small to support specialized firms and intermediate markets. However, as demand grows for the final goods of the industry, stages subject to increasing returns will be spun off. Harrigan (1984), on the other hand, suggested that integration strategies may be quite risky during an embryonic stage because of a high degree of product, process, and market uncertainty. In contrast, integration strategies may be less risky when demand conditions are growing steadily. Finally, integration strategies are likely to become quite risky again as an industry matures because of excess capacity and price cutting. I therefore used the growth of an acquiring firm's stage as a control variable that may partially explain the gains to the acquiring firm.

RESEARCH METHODOLOGY

Data Characteristics

From the large merger series of the Federal Trade Commission (FTC) for the period July 1962–1979, I identified 116 vertical mergers. Using July 1962 as a starting date allows matching mergers with data from the Center for Research in Security Prices (CRSP) daily tapes. The firms studied (a list is available from the author) are diverse, and mergers from many different four-digit Standard Industrial Classifications (SIC) industries are uniformly spread out over the study period. I also identified 1,459 rival firms by selecting firms in the CRSP tapes whose primary four-digit SIC codes were the same as those of the acquiring firms at the times of the merger announcements.

Measures

Performance. I used the cumulative abnormal return (CAR) to measure changes in market value. The following equation predicts the abnormal return (AR) of firm i on date t :

$$AR_{it} = R_{it} - (a - bR_{mt}),$$

where a and b are estimated from a market model by regressing R_i , the daily returns of an individual firm, on R_m , the daily returns of the market portfolio. I estimated the market model for a period 200 to 51 trading days (-200 to -51) before the first announcement of a merger (day 0) in the *Wall Street Journal*. The cumulative abnormal return was computed for each firm for a prediction period starting 50 trading days before the merger announcement and ending 5 days after it (-50 to $+5$).⁴ Stock return data needed to com-

⁴ Using a starting day of 50 days before a merger announcement should capture most of the market reaction to leakage of information regarding an impending merger. Studies using daily data have found that the market reaction stabilizes 3 to 5 days after an announcement.

pute those returns were available for 71 acquiring firms and 54 target firms from the CRSP tapes. I computed the average cumulative abnormal returns for the rivals of each acquiring firm over the same interval. Finally, to correct for heteroscedasticity, I computed a standardized cumulative abnormal return (SCAR) as follows:

$$SCAR = \frac{CAR(n)}{\sqrt{n\sigma}}$$

where $CAR(n)$ is the cumulative abnormal return over n days and σ is the estimated variance of the abnormal returns. Thus computed, a standardized cumulative abnormal return has an asymptotically normal, $N(0,1)$, distribution.

Market power. Four-firm seller concentration ratios—which measure the proportion of industry sales accounted for by the four largest sellers—were used as proxies for market power. At the four-digit SIC level, I could identify 37 target and 50 bidder industries for which seller concentration ratios could be obtained directly from the *Census of Manufacturers* published in the year closest to an announcement.⁵ Although using four-digit SIC data should allow completely objective conclusions, I expanded the study group by 18 more bidder firms and 1 more target firm by obtaining data at the three-digit SIC level. Using three-digit data for supportive evidence seemed justified since by looking at vertical mergers only I eliminated contamination from other narrow-spectrum diversification. However, the use of three-digit SIC codes rested on the assumption that the concentration levels at the three- and four-digit levels are similar.

Researchers have used seller concentration ratios widely to represent market power, but it should be noted that contestable market theory (Baumol, Panzar, & Willig, 1982) suggests that even highly concentrated markets can be vulnerable to entry. Firms in such markets may not have market power. In light of this, two factors need to be kept in mind. To the extent that markets in the study group are contestable, empirical tests will work against the market power hypothesis. Any significant findings will therefore probably represent a conservative test. Second, if the market power theories have any validity, the fact that the acquiring firms initiated the mergers probably puts an ex post bias in the data in favor of the acquiring firms' stages having some market power.

To measure market power in the downstream stage, I chose the buyer

⁵ A potential source of measurement error is failure to identify the markets that contribute to the vertical link. To reduce the chance of measurement error and at the same time keep the data objective, I assumed the core businesses of the acquiring and target firms to be the relevant links unless there was clear evidence to the contrary. I sought such evidence from *Moody's Industrials*, the *Funk and Scott Index of Corporations and Industries*, and the *Wall Street Journal Index*. Instead of subjectively reassigning SIC codes, I dropped these cases from the study.

concentration ratio of the upstream stage. The following illustrates the precision of the buyer concentration ratio: three downstream industries, i_1 , i_2 , and i_3 , use the total output of upstream industry j in the proportions .40, .20, and .40, respectively. Further, the target firm of a given merger is in upstream industry j , and the acquiring firm is in downstream industry i_2 . Finally, industry i_2 is highly concentrated, with a ratio of .80, and the other two downstream industries are less concentrated. If the market power of the acquiring firm's stage is measured by the concentration ratio of i_2 , it appears to be very high (.80). However, if the proportion of industry j 's total output that is going to i_2 (.20) is considered, a very different picture emerges. Despite its high concentration, i_2 does not have much power over the firms in upstream stage j because they have other buyers for the bulk of their output. Since the key feature of the market power hypotheses is the relative market power of the two stages, it is imperative to determine how concentrated all the buyers of the upstream stage's output are—both across and within industries. Using the following formula, the buyer concentration ratio (BCR) of the upstream industry, j , is .32, which represents a much lower level of market power than the seller concentration ratio of the acquiring firm's industry, .80:⁶

$$BCR_{jt} = \sum_{i=1}^n p_{jit} SCR_{it}$$

where p_{jit} is the proportion of the output of upstream industry j that goes to downstream industry i at time t , SCR_{it} is the seller concentration ratio of industry i at time t , and n is the number of downstream industries that use the output of industry j as input.

The buyer concentration ratios and the seller concentration ratios were then combined to compute a measure of the relative market power of the acquiring and acquired firms as follows: relative market power equals the target firm's seller concentration ratio over its buyer concentration ratio if the acquiring firm is downstream; if, however, the target firm is downstream, relative market power is the acquiring firm's buyer concentration ratio over its seller concentration ratio. Thus, relative market power will have a high value when the target firm's stage has the market power, will equal unity when both stages have equal market power, and will have a low value when the acquiring firm's stage has the market power.⁷

Growth. To measure growth, I used the compounded growth rate of the

⁶ I used input-output tables for 1962, 1967, 1972, and 1977 (Lustgarten, 1975) to compute the buyer concentration ratio of industry j .

⁷ Relative market power can be expressed as a difference score instead of as a ratio. The results of tests based on difference scores are very similar to those presented here and are available from the author.

acquiring industry's sales, calculated from the *Census of Manufacturers*, for the five-year period preceding each merger.

Statistical Tests

The following ordinary-least-squares models were used to test the hypotheses. I used both the three- and the four-digit data for all the estimations. The predicted signs are in parentheses.

$$\begin{aligned}
 \text{Acquirer's standardized cumulative abnormal returns} &= \begin{cases} F [\text{acquiring firm's industry seller concentration (+),} \\ \text{target firm's industry seller concentration (-), growth rate (?)}] & \text{(Model 1a)} \\ F [\text{relative market power (-), growth rate (?)}] & \text{(Model 1b)} \end{cases} \\
 \\
 \text{Target's standardized cumulative abnormal returns} &= \begin{cases} F [\text{acquiring firm's industry seller concentration (-),} \\ \text{target firm's industry seller concentration (+)}] & \text{(Model 2a)} \\ F [\text{relative market power (+), growth rate (?)}] & \text{(Model 2b)} \end{cases} \\
 \\
 \text{Standardized cumulative abnormal returns of acquirer's rivals} &= F [\text{acquirer's standardized cumulative abnormal returns (+)}] \quad \text{(Model 3a)}
 \end{aligned}$$

RESULTS

Table 2 shows the means, standard deviations, and correlations among the variables. Multicollinearity was not a problem. The target firms gain nearly 20 percent in cumulative abnormal returns. The acquiring firms, on the other hand, have a statistically insignificant loss of 1 percent with a very large variance, and the rival firms gain a statistically insignificant 0.7 percent.⁸ The acquiring firms came from industries with a slightly higher mean seller concentration (.41) than the target firms (.33). The market power of the target firms relative to that of the bidders has an average value of .95. Thus, when the buyer concentration ratio is used to measure the level of competition in the downstream stage, the acquiring firms' industries are still more concentrated than the target firms'.

Table 3 presents the results for the acquiring, target, and rival firms' regression equations. Of primary interest are the regression results for the acquirers, which indicate that vertical mergers create or destroy value as a function of the market structure of the merging firms' industries. These

⁸ These results are not shown; the tests are available from the author.

TABLE 2
Means, Standard Deviations, and Correlations

Variables	Means	s.d.	N	1	2	3	4	5	6
1. Acquirer's standardized cumulative abnormal returns	-0.00	1.51	71						
2. Target's standardized cumulative abnormal returns	1.64	2.42	54	0.15					
3. Rivals' standardized cumulative abnormal returns	0.09	0.76	81	0.29	-0.05				
4. Relative market power	0.95	0.53	46	-0.43	-0.21	-0.26			
5. Acquiring firm's industry seller concentration	0.41	0.17	56	0.04	-0.23	-0.04	-0.35		
6. Target firm's industry seller concentration	0.33	0.16	55	-0.26	-0.29	-0.31	0.81	-0.09	
7. Growth	0.08	0.05	54	-0.10	-0.12	-0.06	0.18	-0.39	0.03

results are in accordance with Hypothesis 1. The equation involving relative market power, model 1b, provides the strongest support for Hypothesis 1. The coefficient of the acquiring firm's concentration ratio in model 1a, however, is not significant in the equations using seller concentration ratios. The results for the target firms (models 2a and 2b), however, do not support Hypothesis 2, as the market structure of neither the acquirers nor the targets can significantly explain the target firms' gains. Finally, as Hypothesis 3 predicted, the gains to the acquiring firms positively and significantly explain the gains to the rival firms (model 3a), suggesting a common benefit from mergers to all incumbents in an acquiring firm's stage. Rate of growth, however, does not seem to influence the revaluation of acquiring firms in the context of vertical mergers.

DISCUSSION AND CONCLUSIONS

The average gains to the acquiring, target, and rival firms merely confirm previous findings in acquisition research (cf. Jensen & Ruback, 1983). However, the large variation of the acquirers' gains around zero indicates that gains can be made from vertical mergers when acquiring firms select targets from relatively competitive industries. This pattern bears out the predictions of the industrial organization economics (IO) theories. Interestingly, however, an acquiring firm's market structure context (model 1a) does not seem to explain the firm's gains. There are two possible explanations for this lack of relevance. The acquiring firms studied here came from industries that were moderately oligopolistic, with an average concentration ratio of .41 and a coefficient of variation of less than .50. This lack of variation may have contributed to the insignificance of the coefficient for the acquiring firms' seller concentration ratios. A second explanation supported by the regres-

TABLE 3
Results of Regression Analyses^a

Dependent Variables	Acquirer's Standardized Cumulative Abnormal Returns				Target's Standardized Cumulative Abnormal Returns				Rivals' Standardized Cumulative Abnormal Returns			
	Four-Digit SIC Code Data		Three-Digit SIC Code Data		Four-Digit SIC Code Data		Three-Digit SIC Code Data		Four-Digit SIC Code Data		Three-Digit SIC Code Data	
	Predicted Signs	Model 1a	Model 1b	Model 1a	Model 1b	Predicted Signs	Model 2a	Model 2b	Model 2a	Model 2b	Predicted Signs	Model 3a
Intercept	+	1.86* (0.91)	1.17** (0.53)	1.10 (0.94)	1.19** (0.50)	+	3.88** (1.22)	1.25† (0.80)	3.83† (1.20)	1.43† (0.76)	+	0.08 (0.09)
Acquiring firm's industry seller concentration	+	-1.26 (1.29)	-0.07 (1.21)	-0.07 (1.21)		-	2.63 (2.45)		-2.14 (2.23)			
Target firm's industry seller concentration	-	-3.34** (1.36)	-2.87** (1.27)			+	-2.41 (2.19)		-2.67 (2.10)			
Relative market power	-		-1.32** (0.43)		-1.24** (0.39)	+		0.58 (0.47)		0.49 (0.45)		0.01 (0.14)
Acquirer's standardized cumulative abnormal returns											+	0.15** (0.08)
Target's standardized cumulative abnormal returns											?	0.05 (0.05)
Growth	?	-5.14 (5.36)	-1.32 (4.90)	-2.51 (4.95)	-0.43 (4.44)							
F-statistic		2.48*	5.21**	1.85†	5.39**		1.13	1.52	1.12	1.18		6.40†
R ²		.21	.28	.10	.19		.08	.05	.08	.04		.10
df		28	29	43	44		24	25	26	27		70

^a Standard errors are in parentheses.

† $p < .10$

* $p < .05$

** $p < .01$

sion results (model 1b) could simply be that the relative market power variable, which incorporates the buyer concentration ratio, is the more appropriate measure. Not only is this variable strongly significant ($p < .01$), but also the significance of the overall equation is higher than that of the equation using seller concentration ratios (model 1a). Taken together, these findings provide some support for IO predictions that market power at any stage provides profit incentives for the firms at that stage to integrate into neighboring competitive stages.

Unlike the acquiring firms' gains, the gains to the target firms do not seem to be influenced by the market structure variables. There could be several reasons for this lack of effect. The gains to the target firms could have a large random component that covers up any systematic market structure gains. Second, higher concentration does not always imply higher market power (Baumol et al., 1982), so the lack of significance may not be conclusive enough to reject the market structure arguments vis-à-vis target firms.⁹

The regression equations with market structure variables provide some support for IO predictions of higher gains under asymmetric market power, but those explaining the variance of the gains to rivals of the acquiring firms provide stronger evidence for the market power hypothesis (Hypothesis 3) than the efficiency hypothesis. Although I do not have any direct evidence of anticompetitive behavior, the correlation between the gains to the acquiring firms and those of the rivals does not lend itself to an alternate explanation. Further, if market power was indeed the dominant motive behind the vertical mergers studied, it may provide a reason for the absence of highly concentrated, near monopolistic industries in the data. Unlike an oligopolist, a monopolist has total control of a stage, whether it involves a raw material or distribution, making it difficult for an entrant to move into that stage after entering an adjacent stage. Thus, the monopolist has less incentive to use vertical integration as a means of erecting entry barriers than an oligopolist does. The composition of the study group thus provides indirect support for the strategic management modification of the market power hypothesis: if entry is not a threat, vertical integration is not necessary (Harrigan, 1984; Porter, 1980). Since the results for the rival firms seem to support the market power hypothesis, the lack of firms from highly concentrated industries further reinforces the strategic management perspective.¹⁰

Because of the importance of the findings about the rival firms, I replicated model 3a using the gains to the rivals of the target firms as the dependent variable and the gains to the target firms as the independent variable (Table 3, model 3b). Neither the market power nor the efficiency hypothesis

⁹ Further, as Barney (1988) pointed out, other powerful influences may affect gains to target firms.

¹⁰ It needs to be noted that there is no direct support for the strategic management predictions. In fact, recent vertical integration by Motorola and Intel into the downstream PC-minicomputer market cannot be explained by the strategic management theories. Entry barriers in the microchip industry are very high.

offers theoretical expectations about the gains to the rivals of target firms. The regression equation has an insignificant F , and the coefficient of the gains to the target firms are also insignificant.

Overall, the findings support existing IO theories and the strategic management modifications. However, the findings have to be interpreted in light of the limitations of the study. The levels of significance are encouraging, despite the small number of mergers studied. However, a small sample can always contain the unexpected biases; such biases may be especially likely here since I could not include any firm-specific variables. However, the diversity of the firms studied should preclude the presence of any major biases. Finally, the research design suffers from its inability to control for transaction costs.

The results of this study seem to suggest that vertical integration is a strategy that firms can successfully use if their base and adjacent industry have certain characteristics. If future research can replicate these findings using a greater number of mergers, the results would have strong managerial implications. It may pay for a firm to integrate into adjoining, relatively less concentrated stages if it is operating in a moderately concentrated industry. The findings about the rival firms suggest that in a moderately concentrated industry, a vertical merger by one firm may not pose a threat to the other firms. These findings may, of course, also have public policy implications, especially since all these mergers were concluded prior to the lax antitrust enforcement of the Reagan era. I hasten to add, however, that there is no direct evidence here that vertical integration increases market power.

This study also has implications for both research on vertical integration and acquisition studies that use the event-study methodology. The results clearly warrant a fresh investigation of vertical integration with other methodologies. As for acquisition research, there are very few published reports explaining abnormal gains to acquiring firms in terms of firm or market determinants. The findings of this study may pave the way for understanding the determinants of acquisition gains for other classes of mergers. The next logical step in acquisition research could thus be a shift from studies that investigate differences across groups to studies that investigate differences within groups.

Focusing primarily on the industrial organization and the strategic management predictions about vertical integration and market structure, this study has generated some important insights. Future studies should look at other theories, such as those focused on technological innovation or life cycle, and should also replicate this study over different periods. Future research might also develop and test the performance implications of vertical integration by direct entry instead of merger.

REFERENCES

- Bain, J. S. 1956. *Barriers to new competition*. Cambridge, MA: Harvard University Press.
- Barney, J. B. 1988. Returns to bidding firms in mergers and acquisitions: Reconsidering the relatedness hypothesis. *Strategic Management Journal*, 9: 71-78.

- Baumol, W. J., Panzar, J. C., & Willig, R. D. 1982. *Contestable markets and the theory of industry structure*. New York: Harcourt Brace Jovanovich.
- Bork, R. 1978. *The antitrust paradox*. New York: Basic Books.
- Chatterjee, S. 1986. Types of synergy and economic value: The impact of acquisitions on merging and rival firms. *Strategic Management Journal*, 7: 119-139.
- Eckbo, B. E. 1985. Mergers and the market concentration doctrine: Evidence from the capital market. *Journal of Business*, 11: 325-349.
- Harrigan, K. 1984. Formulating vertical integration strategies. *Academy of Management Journal*, 9: 638-652.
- Jensen, M. C., & Ruback, R. S. 1983. The market for corporate control: The scientific evidence. *Journal of Financial Economics*, 11: 5-50.
- Lubatkin, M. 1987. Merger strategies and stockholder value. *Strategic Management Journal*, 8: 39-53.
- Lubatkin, M., & Rogers, R. 1989. Diversification, systematic risk and shareholder return: The capital market extension of Rumelt's study. *Academy of Management Journal*, 32: 454-465.
- Lustgarten, S. H. 1975. The impact of buyer concentration in manufacturing industries. *Review of Economics and Statistics*, 57: 125-132.
- Masten, S. 1984. The organization of production: Evidence from the aerospace industry. *Journal of Law and Economics*, 27: 403-418.
- Porter, M. E. 1980. *Competitive strategy*. New York: Free Press.
- Posner, R. 1976. *Antitrust law*. Chicago: University of Chicago Press.
- Rumelt, R. P. 1974. *Strategy, structure and economic performance*. Boston: Division of Research, Harvard University Graduate School of Business Administration.
- Spiller, P. T. 1985. On vertical mergers. *Journal of Law, Economics, and Organization*, 1: 285-312.
- Stigler, G. J. 1951. The division of labor is limited by the extent of the market. *Journal of Political Economy*, 59: 185-193.
- Walker, G., & Weber, D. 1987. Supplier competition, uncertainty and make-or-buy decisions. *Academy of Management Journal*, 30: 589-596.
- Williamson, O. E. 1985. *The economic institutions of capitalism*. New York: Free Press.

Sayan Chatterjee is an assistant professor of policy at Case Western Reserve University. His current research interests include diversification, corporate development, mergers and acquisitions, and governance structures.

ANTECEDENTS AND OUTCOMES OF DECISION SPEED IN DIFFERENT ENVIRONMENTAL CONTEXTS

WILLIAM Q. JUDGE

ALEX MILLER

University of Tennessee

This study refined and extended some findings of previous research on decision-making speed. Decision speed was associated with simultaneous consideration of many alternatives, regardless of context. In contrast, the relationship between board experience and decision speed was context-specific. Similarly, decision speed was associated with higher performance only in high-velocity environments.

In an era of increasingly global markets and shortened product life cycles, the attention given to the speed of the strategic decision-making process is growing. The Boston Consulting Group has maintained that "the ways leading companies manage time represent the most powerful new sources of competitive advantage" (Stalk, 1988: 41), and another observer has noted that "the big don't outperform the small, the fast outperform the slow" (Thomas 1990: ix). Despite the growing recognition of the importance of the speed with which decisions are made, little is known about this phenomenon (Bluedorn & Denhardt, 1988).

An inductive study by Eisenhardt (1989) addressed this void. Investigating the speed of the strategic decision-making process in the microcomputer industry, an industry she called a "high-velocity environment," she reported that relatively fast strategic decisions led to higher performance. She also found five antecedents of decision speed: the use of real-time information, the presence of experienced counselors, the number of simultaneous alternatives considered, skill in resolving conflict, and the degree to which decisions were integrated.

Like all path-breaking studies, however, this work left several unanswered questions. First, are there antecedents of decision speed other than those Eisenhardt identified? Second, do the antecedents of decision speed vary by environmental context? Finally, is speed related to performance in industry settings not typified by high velocity? The purpose of this study was to begin to refine and extend Eisenhardt's pioneering research on decision speed.

THEORETICAL BACKGROUND

Antecedents of Decision Speed

Eisenhardt's (1989) most compelling findings concerned the identification of two antecedents of decision speed: the number of simultaneous al-

ternatives considered and the presence of experienced counselors. Eisenhardt found that the number of alternatives was positively associated with decision speed. Her explanation for this result was that the simultaneous consideration of multiple alternatives accelerates cognitive processing and hence, decision-making speed. Anderson (1983) and Schwenk (1983) reached similar conclusions.

Hypothesis 1: The number of alternatives considered simultaneously is positively related to decision speed.

Eisenhardt also found that involving experienced counselors sped up the strategic decision-making process. She theorized that experienced counselors gave top management teams the confidence to act quickly and decisively. Although experienced counselors need not be limited to a company's board of directors, clearly the board is in a position to advise and assist top management in making strategic decisions. Vance (1983) noted that experienced boards make faster decisions than inexperienced boards because the members of the former know more about their industry and organization and can focus more quickly on the fundamental strategic issues. On the basis of Eisenhardt's findings and Vance's observations, we would expect that an experienced board would facilitate fast strategic decision making.

Hypothesis 2: The level of board experience is positively related to decision speed.

Decision Speed and Financial Performance

Although Eisenhardt (1989) did not formally test for a relationship between decision speed and financial performance, she did note that fast strategic decisions appeared to be associated with high levels of sales growth and profitability in high-velocity industries. She explained that rapid strategic decisions helped executives to learn fast and to capitalize on market opportunities quickly. The notion of "cycles of learning" (Thomas, 1990: 9) captures a similar idea. The conclusion that speed and performance are associated is certainly in keeping with the experiences of a growing number of corporations that are relying on organizational speed to improve their financial performance. For example, Bower and Hout argued that organizations that make fast decisions "are like World War II fighter pilots—they win by making faster decisions which preempt the opposition's moves" (1988: 110).

But is decision speed equally important in all environments? To extend the Bower and Hout analogy, is fast decision making as critical in trench warfare as it is in a dogfight? These questions suggest that researchers must build context-specific models of decision speed. In view of Eisenhardt's logic and evidence, we expected to find that decision speed only has an impact in high-velocity environments.

Hypothesis 3: Decision speed is positively related to the financial performance of organizations in high-velocity environments.

Decision Speed and Environmental Velocity

An important dimension of the present research is the extension of Eisenhardt's work into domains other than high-velocity environments. This extension required that we introduce organizational size as a control variable; industries have great variation in the typical size of the organizations within them, and we suspected that size might be related to decision speed. Although we were not aware of any formal studies documenting the relationship between size and decision speed, there is persuasive anecdotal evidence suggesting that large organizations have slower decision-making processes than small ones. For example, Ross Perot described the decision process at General Motors as "sluggish" and "lumbering" (*Business Week*, 1986). In contrast, insiders at the relatively small Sun Microsystems referred to the pace of decision making as "frenetic" and "rocket-like" (*Business Week*, 1989). It is widely accepted that large organizations are generally more formal and bureaucratic than smaller organizations (Ford & Slocum, 1977). This formalization has many effects on the strategic decision-making process (Grinyer & Yasai-Ardekani, 1981), one of which may be to slow down or delay strategic decisions.

In modeling the antecedents of decision speed, a second useful control variable is the importance of the decision being made to the organization. High importance is likely to lengthen the decision-making process because the consequences of the decision are greater than they are when a decision is of less importance (Hickson, Butler, Cray, Mallory, & Wilson, 1986; Schwenk, 1988). Donaldson and Lorsch (1983) noted that the perceived riskiness of a decision is often negatively associated with the speed of the decision process. If a relatively small investment fails, an organization will survive, but a wrong decision about a relatively large investment could cripple or even bankrupt the organization. In other words, the risks of being wrong are proportional to the size of the decision being made, and therefore, we would expect that large strategic decisions will involve a slower and more deliberate decision-making process than small ones.

Environmental velocity reflects both the pace of change in an environment and the predictability of the changes that occur. Bourgeois and Eisenhardt characterized high-velocity environments as those in which "changes in demand, competition, and technology are so rapid and discontinuous that information is often inaccurate, unavailable, or obsolete" (1988: 816). By controlling for environmental velocity, they implied that the antecedents and outcomes of decision speed may vary by environmental context. But the specific nature of that variation has not been specified theoretically or empirically.

Although Prescott (1986) did not directly study the relationship between environment and decision speed, he did provide useful theory and research regarding environmental impacts on the relationship between strategy variables and firm performance. He found that environment affects the strength of predictors of financial performance—the size of standardized

coefficients—but not the form of the predictors (the signs of the coefficients). The implication of Prescott's findings for this research is that variables positively (or negatively) related to decision speed in one environment should be positively (or negatively) related to it in other environments. However, we would expect the strength of the relationship to vary across environmental contexts.

More specifically, we would expect the relationship between the antecedents and outcomes of decision speed to be stronger in high-velocity environments. Eisenhardt suggested that in such environments, decision speed is most critical. In slower moving, more predictable environments, factors not related to decision speed are more likely to be influential in shaping the decision-making process. Likewise, in low-velocity environments, speed is less likely to be critical to financial performance. The foregoing discussion suggests the final hypothesis:

Hypothesis 4: The strength of the relationship between decision-making speed and its antecedents and outcomes increases as environmental velocity increases.

METHODS

Sample Description

Although there is no standard measure of environmental velocity, we suspect that most people know a high-velocity environment when they see one. Bourgeois and Eisenhardt (1988) argued that velocity is similar to environmental dynamism (Dess & Beard, 1984) but that velocity also involves discontinuous, qualitative changes. Following those researchers, we operationally defined velocity as industry growth coupled with changes in technology and such other disruptive forces as governmental regulations, and tentatively identified three industries we judged to vary in velocity.

Then, using archival data, we measured growth as (1) change in industry employment and (2) change in industry sales. We measured technological change using a seven-point, one-item scale assessing 86 executives' perceptions of the pace of technological change in their industries. There were multiple raters in each organization; those raters included 32 CEOs and the 54 other executives judged by the CEOs to be most involved in the decision being studied. The technology change data were then averaged for each of the three industries, and the mean values were found to be statistically different from each other ($p < .05$). Finally, we compiled archival data to qualitatively describe additional competitive, technological, and governmental discontinuities for each of the three industries. On the basis of this evidence, we classified one as a high-velocity environment, one as a medium-velocity environment, and one as a low-velocity environment. The three environments were not assessed on any absolute scale but relative to one another (see Table 1).

Biotechnology. Our high-velocity sample consisted of new biotechnology firms. This industry has been experiencing dramatic entry and exit of

TABLE 1
Environmental Velocity Comparisons of Three Organizational Populations

Velocity Dimension	Biotechnology	Hospitals	Textiles
Compound annual employment growth, 1983-87	17.3%	0.3%	-0.1%
Compound annual sales growth, 1983-87	100.0%	8.0%	6.5%
Perceived pace of technological change ^a	6.46	6.06	5.58
New competitive actions	Joint ventures with national and international corporations Acquisitions of cash-starved start-ups Diversification into new applications areas	Diversification into related areas of health care such as nursing homes, outpatient clinics, and insurance programs Expanded use of advertising and marketing tactics	Industry consolidation through horizontal integration and restructuring Increasing emphasis on market segmentation
New technologies	Genetically engineered products for drug, chemical, agriculture, and energy industries Monoclonal antibody technologies for same industries listed above	Magnetic Resonance Imaging Doppler ultrasound scanners Angioplasty catheters Cardiovascular drugs New diagnostic tests	Direct card feeding Open-end spinning machines
Government initiatives	New patent application procedures New product-testing regulations Changing investment priorities by funding agencies	Prospective payment system for Medicare patients Changing payment systems for Medicaid patients	Multifiber Arrangement ^b limits domestic imports Agriculture department subsidizes domestic cotton production

^a This value is derived from a perceptual measure on a seven-point Likert scale.

^b The Multifiber Arrangement is a bilateral, international trade agreement governing world textile imports and exports.

firms, exponential growth, fast-changing technologies, and a flood of new government regulations. In addition, governmental approval and disapproval of bioengineered products and processes creates ongoing uncertainty. Kimberly and Quinn observed that "the 1980s are witnessing a virtual explosion of new companies being built around emerging technologies, primarily in the information and biotechnology fields" (1984: 2), a statement that reinforces our belief that our biotechnology sample is comparable to Eisenhardt's microcomputer sample in terms of environmental velocity.

Hospitals. Environmental velocity is not quite as high for the hospital industry, as evidenced by its moderate levels of demand growth and intermediate levels of technological change. New competitive forms are developing, new technologies are being introduced, and government influence, particularly in the area of funding, is changing substantially as a consequence of the implementation of prospective payment legislation in 1983.¹ However, these changes are not as dynamic or discontinuous as those in the biotechnology industry. For example, customer demand, competition, and technology are much more predictable for hospitals than for biotechnology firms. Therefore, the hospital industry represents an industry with moderate environmental velocity.

Textiles. In this industry, growth in employment is slightly declining, and growth in sales showed the lowest gains of the three industries studied. Also, the perceived pace of technological change was the lowest of the three industries. The domestic textile market had few new entrants during the course of a consolidation that took place throughout the 1980s; further, technical advances in the industry are incremental, and governmental influence has been low. Clearly, this industry has the slowest and most predictable level of environmental change of the three industries studied.

There were no geographical sampling restrictions on the biotechnology firms or the textile firms. In the interest of controlling data collection costs, we limited the hospital sample to general medical hospitals in North Carolina. Graeff (1980) argued that three key variables determine the generalizability of hospital subsamples: size, ownership, and technical domain. After testing for differences in size (number of beds), ownership (private versus public), and technical domain (general versus specialized), we found no significant differences between the North Carolina population and the national population. Therefore, all three of this study's subsamples should be generalizable to the relevant national populations.

After randomly selecting organizations from lists of the three populations, we solicited 41 chief executive offices (CEOs) by mail and then made follow-up telephone calls to confirm their participation in this study. Of the 41 CEOs, 32 agreed to participate, yielding a 78 percent response rate. Ten

¹ The intent of this legislation was to control skyrocketing Federal costs for Medicare patients by reimbursing hospitals on a new, predetermined prospective payment scheme rather than the previous, cost-plus retrospective payment scheme.

organizations each from the biotechnology and textiles industries participated, and 12 of the hospitals. (The original design called for 10 hospitals, but happily, the chief executives of 12 of the 13 hospitals that were solicited agreed to participate.) There were no significant differences between responding and nonresponding firms on the basis of size or financial performance.

Primary data were collected for 1985 through 1987. We then interviewed two or three people at each of the 32 organizations during 1988. Each CEO was first interviewed and asked to identify and describe the most critical strategic decision that had culminated during the study period. Then we asked the CEO to identify one or two other executives or directors in the organization who were involved in that decision. Telephone interviews were conducted with these individuals in order to confirm and elaborate the CEO's description. Without exception, every interviewee in each firm identified the same strategic decision as the most significant one that had culminated over the study period.

The decisions represented a broad range of strategic areas that included the following (listed from most to least frequent): competitive investment (37.5%), horizontal integration (18.9%), internal diversification (12.5%), vertical integration (9.4%), joint venture (6.2%), retrenchment (6.2%), divestment (6.2%), and external diversification (3.1%). Overall, we conducted 86 semistructured interviews. In addition to the interview data, archival data on each organization's board of directors, size, and financial performance were also collected.

Variables and Measures

Decision speed. Following Eisenhardt (1989), we defined decision duration as "the time between the first reference to deliberate action, such as scheduling a meeting or seeking information, to the time in which a commitment to act was made." We asked interviewees to describe the most significant strategic decision made in their organizations over the study period, and in the course of that description, identified decision duration. The durations ranged from 1 month to 24 months ($\bar{x} = 18.3$). Because decision duration reflects the slowness of a decision, we reversed the scale for our dependent variable to reflect decision speed. This reverse scaling was achieved by subtracting decision duration from 25, yielding a more intuitive metric for decision speed in which high values reflect fast decisions and low values, slow decisions.

Decision importance. Because our instructions to interviewees restricted the strategic decisions identified to nonroutine resource allocation decisions affecting the long-term performance of their organizations, each individual could provide dollar estimates of the size of the investment (or divestment) made. We operationally defined decision importance as the absolute value of the size of an investment or divestment relative to the total assets of an organization. When discrepancies about the decision size esti-

mates emerged in three organizations, we used internal organizational documents to resolve them.

Organizational size. Because two of our constructs, organizational size and board experience, seemed to be inherently multidimensional, we used factor analysis with varimax rotation to develop them from a pool of six variables. Organizational size was measured as the principal component of organizational sales, assets, and employees in 1986, the middle of the study period. The factor loadings for the three variables were .976, .982, and .980, respectively, and the factor's eigenvalue was 2.930.

Board experience. In the same factor analysis, board experience was measured as the principal component of the average board member's tenure on the board, average age, and average years of working experience in the focal industry in 1986. The factor loadings for the three variables were .943, .847, and .417, respectively, and the factor's eigenvalue was 1.831. Although the loading for average industry familiarity was relatively low, it was above the often-used heuristic level of .4. Furthermore, previous researchers on board experience (e.g., Vance, 1983; Zahra & Pearce, 1988) have argued that industry familiarity is a critical component of a board's involvement in the strategic decision process, so its inclusion is warranted theoretically.

Number of alternatives. We asked the CEOs to identify and discuss each of the alternatives that were simultaneously considered in making the decision studied. As a check on the reliability of these data, we also queried one or two other organization members about the alternatives considered. In all but one organization, the CEO reliably estimated the number of alternatives considered simultaneously. In that one instance, follow-up interviews resolved the initial discrepancy so that interrater reliability across all organizations was high.

Organizational performance. The three most common ways of measuring organizational performance are profitability, sales growth, and stock appreciation. Since the hospitals studied were not publicly traded, this study relied on the first two measures. We calculated the profitability of each organization by averaging its return on assets over the study period (1985 through 1987) and computed average annual growth by averaging the annual sales growth rate from 1984 through 1987.

Assessing the Data

Descriptive statistics, provided in Table 2, indicated that almost all the contextual variables varied significantly across our subsamples of three environmental contexts. The biotechnology firms were notable for their small size, rapid growth, negative profitability, and the relatively low experience of their boards. In contrast, the firms in the textile subsample were notable for their relatively large size, low profitability, and high board experience. Other contextual variables displayed similarly credible face validity for the hospital subsample.

The contextual variables tended to vary significantly by subsample, but decision speed itself did not. This fact greatly enhanced our ability to inter-

pret results across the three subsamples. Our fourth hypothesis suggests that environmental velocity moderates the antecedents and outcomes of decision speed. In fact, we made considerable effort to insure that we studied comparable, or roughly equivalent, decisions in each firm to avoid comparing "apples and oranges." Decision importance was found to vary significantly by environmental context, but we removed the effect of this potential confound by treating decision importance as a control variable.

The correlation matrix describes the interrelationships between the predictor and dependent variables. There were no significant relationships between predictor variables, indicating that there was no multicollinearity problem.

RESULTS

To test the first two hypotheses, we regressed decision speed on number of alternatives and board experience after having first controlled for the effects of organizational size and decision importance. Since the first two hypotheses focus on the overall relationship between the proposed antecedents and decision speed, we performed this hierarchical regression analysis for the overall sample. Table 3 gives these results. As Hypothesis 1 predicts, number of alternatives is positively related to decision speed for the overall sample ($p < .01$). Thus, there is strong support for the proposition that the number of alternatives simultaneously considered is a critical determinant of decision speed regardless of environmental context. Contrary to the predictions of Hypothesis 2, board experience was negatively related to decision speed. From the overall sample, it appears that as a board becomes more experienced, it may slow down strategic decisions.

Next, we regressed decision speed on the sales growth of each organization after employing the same two control variables used in the first regression equation. Similarly, we regressed decision speed on profitability, again using the controls. Table 4 reports results for Hypothesis 3, pertaining to the effects of decision speed. We found that, with organizational size and decision importance controlled, fast strategic decision making is not associated with profitability and sales growth across all environments. After regressing decision speed against our performance measures in each of the three subsamples, however, we found a strong and positive relationship between speed and performance in the biotechnology subsample. These results support our third hypothesis.

To test Hypothesis 4, we included the interaction between the predictor variables and environmental velocity in the regression analysis, representing environmental velocity as +1 for the biotechnology subsample, 0 for the hospital subsample, and -1 for the textile subsample. As can be observed in Table 3, the strength of the relationship between board experience and decision speed increases as environmental velocity increases ($p < .10$). We further found that the strength of the relationship between decision speed and growth ($p < .10$) and profitability ($p < .10$) also increases with environmental velocity (see Table 4).

TABLE 2
Descriptive Statistics^a

Variables	Overall Sample		Biotechnology		Hospitals		Textiles		Pearson Correlations					
	Means	s.d.	Means	s.d.	Means	s.d.	Means	s.d.	1	2	3	4	5	6
1. Decision speed	18.31	5.14	18.70	4.39	17.91	3.94	18.40	7.22						
2. Decision importance	0.31	0.28	0.49	0.29	0.17	0.24	0.30	0.24	0.25					
3. Organizational size ^b	-0.05	0.67	-0.37	0.18	-0.10	0.26	0.33	1.09	3.12†	-0.01	-0.10			
4. Number of alternatives	2.84	0.80	2.90	0.99	2.87	0.65	3.00	0.82	0.48	0.51*	0.10	-0.02		
5. Board experience ^c	0.00	1.00	-0.42	0.68	-0.15	1.19	0.58	0.85	3.05†	-0.26	-0.15	0.04	-0.20	
6. Average return on assets	-1.21	14.64	-15.90	18.69	6.25	3.11	4.50	5.21	13.08**	0.15	-0.34†	0.25	0.07	0.23
7. Average sales growth	17.09	35.79	32.90	61.76	7.58	4.96	12.70	12.14	1.52	0.16	0.20	-0.02	-0.20	0.04

^a For overall sample and correlations, $n = 32$. For the biotechnology firms, $n = 10$, for the hospitals, $n = 12$, and for the textiles manufacturers, $n = 10$.

^b This variable is the principal component of organizational sales, assets, and employees in 1986.

^c This variable is the principal component of the average board member's tenure, age, and industry experience in 1986.

† $p < .10$

* $p < .05$

** $p < .01$

TABLE 3
Relationships Between Antecedents and Decision Speed^a

Antecedents	Overall Sample	Biotechnology	Hospitals	Textiles
Number of alternatives	0.68**	0.68*	0.25	0.60†
Board experience	-0.67†	0.62*	-0.67*	0.06
Number of alternatives by environmental velocity	0.08			
Board experience by environmental velocity	0.64†			
Partial R ²	0.61	0.59	0.61	0.39
Adjusted R ²	0.60	0.47	0.52	0.21
Partial F	10.66**	4.94*	7.05*	2.20

^a Organizational size and decision importance were control variables. Blanks indicate that a statistic would not be meaningful to the analysis. Industry effects are only meaningful in the cross-industry model; see the results for the overall sample.

† $p < .10$

* $p < .05$

** $p < .01$

The relationship between number of alternatives and decision speed, however, appears not to vary with environmental context, as the nonsignificant interaction term in the regression equation shows (Table 3). This finding suggests that the number of alternatives simultaneously considered is a crucial determinant of decision speed in any situation. In sum, results largely supported Hypothesis 4, except for the relationship between number of alternatives and decision speed.

DISCUSSION

Results

This research has three noteworthy findings. First, we found that the number of alternatives simultaneously considered is always positively associated with decision speed, regardless of environmental context. If organizations want to make faster decisions, they may want to consider developing as many alternatives as possible and comparing them simultaneously, not sequentially.

Second, we found that the impact of board experience on decision speed varied with its environmental context. In our textiles and biotechnology subsamples, it appeared that higher levels of board experience were associated with faster strategic decisions. In our nonprofit hospital subsample, however, board experience was negatively related to decision speed. Clearly, board behavior differs in the for-profit and nonprofit subsamples, but it is unclear why this is the case and beyond the scope of this research to state reasons for the difference definitively. One possible explanation may be the unique character of nonprofit hospital boards.

TABLE 4
Relationships Between Decision Speed and Financial Performance^a

Antecedents	Sales Growth				Return on Assets			
	Overall Sample	Biotechnology	Hospitals	Textiles	Overall Sample	Biotechnology	Hospitals	Textiles
Decision speed by environmental velocity	0.11	0.87*	0.28	0.23	0.37	0.63*	--0.29	0.13
Partial R ²	0.43†				0.52†			
Adjusted R ²	0.21	0.49	0.08	0.05	0.25	0.40	0.05	0.02
Partial F	0.19	0.40	0.00	0.00	0.21	0.35	0.01	0.00
	2.22	6.03*	0.95	0.13	2.83†	5.42*	0.67	1.60

^a Organizational size and decision importance were control variables. Blanks indicate that a statistic would not be meaningful to the analysis. Industry effects are only meaningful in the cross-industry model; see the results for the overall sample.

† $p < .10$

* $p < .05$

The nonprofit hospitals had boards populated primarily, if not exclusively, by outsiders. Furthermore, these outsiders typically come from for-profit industries, in which there is more agreement about organizational goals than there is in nonprofit organizations (Delbecq & Gill, 1988). We speculate that the less aggregate experience the members of such boards have in nonprofit organizations in general, and in hospitals in particular, the more they are likely to delegate decision making to hospital administrators. The administrators have greater experience than the board members, and left alone can probably make faster decisions. However, as outsiders on a board gain experience with a hospital and its industry, they may feel more comfortable involving themselves with major strategic decisions. This involvement of an additional organizational entity would naturally slow down decision making, especially if the board members have substantial but incomplete knowledge of a decision area.

Third, this study provides additional support for the claim that the strategic decision-making process needs to be studied on an industry-by-industry, context-specific basis (e.g., Frederickson, 1984; Huff, 1982). For example, there are no significant relationships between decision speed and sales growth or profitability for the overall sample. However, decision speed is a powerful predictor of organizational performance in the biotechnology subsample; the variance explained in these models is especially impressive given the level of "noise" usually associated with modeling performance in new ventures (Miller, Wilson, & Adams, 1988). It is noteworthy that decision speed explained nearly 38 percent of the variance in sales growth and over 42 percent of the variance in profitability for these firms. Decision speed, however, explains much less variance in the performance indicators for the other two subsamples after organizational size and decision importance are controlled. In addition, the results pertaining to board experience especially emphasize the need to study the strategic management process in context-specific samples.

Limitations and Conclusions

Several limitations of this research should be noted. First, the small size of the sample limits the robustness and range of the statistical analysis appropriate for this study. Even though the sample in this study is four times larger than that in Eisenhardt's original study, the statistical conclusions should be interpreted cautiously. Second, the number of informants per firm is relatively small. Although this study benefits from having multiple informants in each firm, conducting more than three interviews per firm would increase the reliability and validity of data.

Finally, only the most significant strategic decision concluded over the study period was examined at each organization. Those decisions may or may not have been typical of other strategic decisions even within the same organizations. As Mintzberg noted, strategy is a "pattern in a stream of decisions" (1978: 935). Since this study only examined a single strategic decision in each firm, findings may or may not represent the overall pattern

of decision making in these firms. However, given Frederickson and Iaquinto's (1989) recent finding that the strategic decision process has an inertial quality, this limitation may not be a severe problem.

Despite these limitations, this study makes two significant contributions to the literature on decision speed. First, it deductively replicates some of the findings of a path-breaking, inductive study on decision speed by Eisenhardt (1989). Second, it extends those findings into a high-, a medium- and a low-velocity context. In so doing, this study refines and extends understanding of the antecedents and outcomes of decision speed.

REFERENCES

- Anderson, P. 1983. Decision making by objection and the Cuban missile crisis. *Administrative Science Quarterly*, 28: 201-222.
- Bluedorn, A., & Denhardt, R. 1988. Time and organizations. *Journal of Management*, 14(2): 299-320.
- Bourgeois, L., & Eisenhardt, K. 1988. Strategic decision processes in high velocity environments: Four cases in the microcomputer industry. *Management Science*, 34: 816-835.
- Bower, J. L., & Hout, T. M. 1988. Fast-cycle capability for competitive power. *Harvard Business Review*, 66(6): 110-118.
- Business Week*. 1986. Ross Perot's crusade. October 6: 60-65.
- Business Week*. 1989. High noon for Sun. July 24: 70-75.
- Delbecq, A., & Gill, S. 1988. Developing strategic direction for governing boards. *Hospital and Health Services Administration*, 33: 25-35.
- Dess, G., & Beard, D. 1984. Dimensions of organizational task environments. *Administrative Science Quarterly*, 29: 52-73.
- Donaldson, G., & Lorsch, J. 1983. *Decision making at the top*. New York: Basic Books.
- Eisenhardt, K. E. 1989. Making fast strategic decisions in high-velocity environments. *Academy of Management Journal*, 32: 543-576.
- Ford, J. D., & Slocum, J. W. 1977. Size, technology, environment and the structure of organizations. *Academy of Management Review*, 2: 561-573.
- Frederickson, J. 1984. The comprehensiveness of strategic decision processes: Extension, observations, future directions. *Academy of Management Journal*, 27: 445-466.
- Frederickson, J., & Iaquinto, A. 1989. Inertia and creeping rationality in strategic decision processes. *Academy of Management Journal*, 32: 516-542.
- Graeff, C. L. 1980. Some methodological issues concerning comparative hospital studies. *Academy of Management Review*, 5: 539-548.
- Grinyer, P. H., & Yasai-Ardekani, M. 1981. Strategy, structure, size, and bureaucracy. *Academy of Management Journal*, 24: 471-486.
- Hickson, D., Butler, R., Cray, D., Mallory, G., & Wilson, D. 1986. *Top decisions*. San Francisco: Jossey-Bass.
- Huff, A. 1982. Industry influences on strategy reformulation. *Strategic Management Journal*, 3: 119-131.
- Kimberly, J. R., & Quinn, R. E. 1984. *Managing organizational transitions*. Homewood, IL: Richard D. Irwin.
- Miller, A., Wilson, B., & Adams, M. 1988. Financial performance patterns of new corporate ventures. *Journal of Business Venturing*, 3: 287-300.

- Mintzberg, H. 1978. Patterns in strategy formulation. *Management Science*, 24: 934–948.
- Prescott, J. 1986. Environments as moderators of the relationship between strategy and performance. *Academy of Management Journal*, 29: 329–346.
- Schwenk, C. 1983. Laboratory research on ill-structured decision aids: The case of dialectical inquiry. *Decision Sciences*, 14: 140–144.
- Schwenk, C. 1988. *The essence of strategic decision making*. Lexington, MA: Lexington Books.
- Stalk, G. 1988. Time—The next source of competitive advantage. *Harvard Business Review*, 66(4): 41–51.
- Thomas, P. R. 1990. *Competitiveness through total cycle time*. New York: McGraw-Hill Book Co.
- Vance, S. C. 1983. *Corporate leadership: Boards, directors, and strategy*. New York: McGraw-Hill Book Co.
- Zahra, S., & Pearce, J. 1988. *Power relations, board behavior, and company performance*. Paper presented at the annual meeting of the Academy of Management, Anaheim, CA.

William Q. Judge (Ph.D., University of North Carolina at Chapel Hill) is an assistant professor in the Strategic Management Group at the College of Business Administration, University of Tennessee. His research interests focus on the speed, time horizons, and participants in the strategy formation process.

Alex Miller (Ph.D., University of Washington) is an associate professor in the Strategic Management Group at the College of Business Administration, University of Tennessee. His research interests are the management of technical and organizational innovation and functional-level strategic management.

ATTITUDINAL AND BEHAVIORAL EFFECTS OF AUTONOMOUS GROUP WORKING: A LONGITUDINAL FIELD STUDY

**JOHN L. CORDERY
WALTER S. MUELLER
LEIGH M. SMITH
Curtin University of Technology**

This article reports on a longitudinal study of autonomous work groups at a new and an established minerals processing plant. The results of the study support the proposition that employees in autonomous work groups report more favorable work attitudes than their counterparts in traditionally designed jobs but confirm previous findings of higher absenteeism and turnover among autonomous work groups.

For some time now, the implementation of autonomous, or self-regulating, work groups (Cummings, 1978) has been a common focus of sociotechnical systems approaches to work redesign (Wall & Martin, 1987). Sociotechnical systems theorists have argued that self-regulating work groups have a favorable impact upon member attitudes and behavior (e.g., Emery, 1959; Herbst, 1974; Pasmore, 1988), predictions that are consistent with those made within other theoretical perspectives on work design for autonomous working arrangements (e.g., Hackman, 1983; Hackman & Oldham, 1976). The quality of the empirical research supporting these assertions has, however, often been called into question (Lawler, 1977; Pasmore Francis, & Haldeman, 1982; Wall, Kemp, Jackson, & Clegg, 1986), and a major longitudinal study of autonomous work groups (Wall et al., 1986) failed to fully support claims of positive attitudinal and behavioral outcomes. Although that study found clear links between employee perceptions of work group autonomy and intrinsic job satisfaction, it is also found that the operation of autonomous work groups "did not demonstrably affect reported levels of job motivation, organizational commitment, mental health, work performance, and voluntary labor turnover" (Wall et al., 1986: 298). Furthermore, the study identified a number of potential disadvantages, including threats posed for supervisory jobs, resistance to change within established and unionized sites, and increased managerial time and effort. The purpose of the current study was to provide further empirical evidence on the impact of autonomous work group membership upon employee attitudes and behavior.

SETTING

The study was conducted at a "greenfield," or newly initiated, and an established minerals processing plant owned and operated by the Australian arm of a multinational corporation. This organization operates several such plants in Australia and, in starting up the greenfield plant, wanted to create a plant organizationally different from those it currently had operating. Specifically, the group of senior managers charged with starting up the new plant was committed to work designs and organizational structures that would maximize the effectiveness of the plant by fostering a high level of employee commitment to organizational goals. This commitment resulted in a choice of organization design centered on the operation of autonomous work groups in the processing area. This decision represented something of a departure from usual management styles within the company, which might be best described as rational goal-oriented (Quinn & Rohrbaugh, 1983). Negotiations with the five major unions associated with the company resulted in general agreement to start up the new processing plant with the understanding that individual union agreements would be negotiated governing specific working arrangements of the type mentioned. The industrial relations climate within the company was good at the time of the study, with no major disputation, despite declining metals prices and a resultant management decision to mothball an operating unit in one of its aging plants and to reduce staff in that plant through nonreplaced attrition.

Processing operations at the new refinery were controlled from start-up by ten autonomous work groups of 10–12 shift process employees. A rotating five-shift system meant that two of these work groups were on site at any one time, each controlling different halves of the process in two distinct geographical areas. The areas of collective decision-making responsibility assigned to these work groups were similar to those described by Gulowsen (1972) in defining the criteria for autonomous work groups; they included such aspects as allocating work, including work group administrative roles, maintaining safety and housekeeping standards, planning shift operations, determining work priorities, ordering operating supplies, and making recommendations on the hiring of new work group members. The first-line supervisory role was defined in planning documents as that of "boundary management" (Cummings, 1978), or helping the work groups achieve their goals by providing them with information, training, and support resources. Supervisors were to provide minimal direction to the teams on day-to-day activities, with responsibility for daily operational decisions resting with the work groups.

In addition to the development of work group autonomy, a further feature of autonomous group working being implemented here was "multiskilling." This feature, with its associated potential for job rotation, is common in autonomous work groups (Cherns, 1976). In this organization, the acquisition and use of a flexible range of skills within a work group was

to be encouraged by means of (1) a reduction in the number of distinct job titles and classifications within the processing area, creating a single job title, "process worker," with three pay levels; (2) a modular training system, allowing for the progressive accumulation of skills of increasing complexity and diversity; (3) a formal system of job rotation, to be managed by the work groups; and (4) payment based on the number of different skills possessed rather than on the work performed.

At both sites, additional categories of work groups operated. Although the autonomous work groups performed some basic maintenance and maintenance-preparatory tasks, separate day crews performed all major plant and equipment maintenance (electrical, mechanical, and instrumental), operating from logged fault reports and planned maintenance programs. It is of interest that, despite the high levels of interdependence and interaction between the maintenance and production functions, the maintenance work groups did not operate as autonomous work groups, in terms of their level of discretion, the autonomy afforded group members, or their functional flexibility. Protracted negotiations aimed at an agreement permitting maintenance workers to acquire skills across the three traditional trades boundaries (mechanical, electrical, and instrumental) and the development of a multi-skilled team approach to maintenance work were stalled for the entire period of the study. Supervisory responsibility remained with the traditional maintenance foremen, who continued to operate in the manner observed at other sites operated by this firm. The maintenance workers are of particular interest as the responsibilities of the autonomous process worker groups at the greenfield site included some basic activities performed only by maintenance workers at the traditionally operated site. Other studies have commented on the dissatisfaction arising out of changes to maintenance and craft demarcations (e.g., Shaiken, Herzenberg, & Kuhn, 1986), and we saw a similar potential for negative attitudes among maintenance employees here.¹

At the greenfield site, we gained access as external evaluators of the new organization design; at the established site, we were to evaluate organization development activities. Our role reflected the caution with which both management and the unions approached such a departure from traditional working arrangements. At both sites, a steering group consisting of representatives of all major union and functional groups on site controlled our activities. Formed after a series of information meetings with all employees at the greenfield site, the role of this steering group was to monitor the research, to approve its methodology and content, and to disseminate its findings within both sites.

¹ Other types of work groups at the plants included traditionally organized day process workers at both sites and shift maintenance work groups at the traditional site. Complete data were not available for either group at the traditional site at our second questionnaire administration, so they do not form part of the analyses reported here.

THE AIMS OF THE STUDY

The current study looked at the operation and attitudinal outcomes of the autonomous work groups for shift process workers over a two-year period. Specific research hypotheses were as follows:

Hypothesis 1: Employees in autonomous work groups report higher levels of job satisfaction, organizational commitment, and trust in management than their counterparts in traditionally designed jobs.

Hypothesis 2: Employees in autonomous work groups show lower levels of absenteeism and turnover than their counterparts in traditionally designed jobs.

In addition, because of the potential for dissatisfaction among the maintenance employees at the greenfield site, we hypothesized that

Hypothesis 3: Maintenance employees operating in traditional working arrangements alongside autonomous process worker teams whose skills overlap with their own will report lower levels of job satisfaction, organizational commitment, and trust in management than their counterparts who are not operating alongside autonomous process worker teams.

METHODS

Research Design

The design of the study centered on the existence of an established plant located within 100 kilometers of the greenfield site. At the established plant, employees operated identical, though slightly older, equipment to refine the same ore and were subject to the same personnel policies as the new plant's employees. Pay levels differed at the two plants in terms of their ceilings for certain production process employees, with levels higher at the greenfield site, though at the time of study no greenfield process employees had achieved higher levels of pay than their counterparts at the established site. An identical shift system was in operation at the two sites. Generally, the approach to work organization at the established site could be described as traditional; responsibility for the types of decisions discussed earlier in relation to the greenfield site's autonomous work groups rested firmly with first-level supervisors, job boundaries were narrowly defined, and jobs were narrowly classified. At the established site, however, one particular work group of 16 shift process workers had for a number of years operated as an autonomous work group. In fact, this group of shift process workers had acted as a stimulus to the senior managers involved in setting up the greenfield site in their choosing to make self-regulating process worker teams the basis of the new site's work design.

The test of the first two hypotheses involved comparisons between the job perceptions and work attitudes of three categories of shift process

worker: greenfield and established site employees in autonomous work groups and established site employees operating under the traditional work design. Data were collected at two times, one year apart. These contrasts represent a post-test, longitudinal, quasiexperimental design that contains a number of potential threats to validity (Cook & Campbell, 1979), an issue that we address specifically in the discussion of results. We tested Hypothesis 3 by examining the job perceptions and attitudes of day maintenance employees from the two sites over the same time period.

Measures

Perceived intrinsic job characteristics. We used 10 items developed by previous researchers (Warr, Cook, & Wall, 1979) to measure individuals' perceptions of the extent to which their own jobs possessed task characteristics theoretically predictive of intrinsic job satisfaction. The 10 items combine to form an overall index of job scope.

Work role autonomy. This variable was measured with a modified 15-item version of the scale used by Wall, Kemp, Clegg, and Jackson (1986) assessing the extent to which employees perceived the decision-making responsibilities associated with autonomous group working as having been delegated to their work groups. Data for this measure were only available from employees at the greenfield site.

Other measures. An 8-item scale (Warr et al., 1979) measured extrinsic satisfaction, or satisfaction with pay, conditions, supervision, and the like. A 7-item scale assessed intrinsic satisfaction (Warr et al., 1979), or satisfaction with the job itself, the amount of discretion it offered, variety, feedback, and so forth. Organizational commitment was measured with 9 items (Cook & Wall, 1980) tapping the level of identification, involvement, and loyalty employees felt toward the organization. Trust in management was assessed with 6 items (Cook & Wall, 1980) measuring employees' perceptions of the level of their trust in management's honesty and competence to make effective decisions.

Absence and turnover data were collected from organizational records, available only in aggregate computerized form. It was therefore not possible to link individual attitudinal scores with absence records or turnover data. Turnover, assessed over the 12 months between survey administrations, was the number of employees voluntarily leaving the organization from a particular occupational grouping expressed as a percentage of the total number employed in that grouping. Absenteeism was assessed in two ways: first, as the number of hours lost for all types of absence (excluding recreational leave) as a percentage of the total number of hours available to be worked, and second, as the frequency of absence per person employed. Both measures involved a 12-month average up to and including the second round of survey data collection.

Procedures

At the greenfield site, questionnaires were administered 8 months (time 1) and 20 months (time 2) after start-up. We obtained completed question-

naires from 130 shift process and maintenance employees both times, a response rate of over 80 percent. We held interviews of about one and a half hours duration with a stratified random sample of 26 shift process and 16 maintenance workers at the greenfield site both times and collected data from observation and plant records. At the established site, questionnaires were administered over the same time period as part of an independent exercise aimed at evaluating the impact of organization development (OD) activities at that site. Completed surveys were obtained from 242 shift process and maintenance employees at time 1 and from 172 employees at time 2, response rates of over 80 and 60 percent. The planned OD activities affecting shop floor employees had yet to take place when the repeat questionnaire was administered.

Analyses

Initially, we conducted a two-way multivariate analysis of variance (MANOVA) on the data generated from the shift process groups. The two forms of work design and the two sites were combined to form a single nominal classification factor, work design, with three levels: established site, traditional work design; established site, autonomous work design; and greenfield site, autonomous work design. Time was the second factor.² Two designs were used for the longitudinal analysis: a fully saturated model (work design, time, work design by time), and two Helmert contrasts, (1) the traditional work group against the weighted mean of the established and greenfield autonomous work groups and (2) a comparison of the means of the members of the two autonomous work groups. A subsequent two-way MANOVA was conducted for the maintenance groups, with two factors, site and time. Pillais's trace ($p < .05$) was used as the multivariate test in all multivariate analyses (Stevens, 1986: 186.) We conducted an additional manipulation check involving work role autonomy using a two-way ANOVA crossing work group by time.

RESULTS

Table 1 presents Pearson product-moment correlations and coefficient alphas for the data set as a whole.

² We created a single factor with three levels because there was no traditional shift process group at the greenfield site. All analyses reported here were performed using standard SPSS-X statistical programs (SPSS Inc., 1988). A set of single degree-of-freedom Helmert contrasts (SPSS Inc., 1988: 614) compared the means of the ordered levels of a factor with the weighted means of subsequent levels of that factor. For this study, the levels of work design were ordered: established site, traditional work design; established site, autonomous work design; greenfield site, autonomous work design. Thus, the first contrast tested whether the traditional group differed from the autonomous groups, and the second contrast tested whether the autonomous groups differed between sites.

TABLE 1
Intercorrelations^a

Variables	1	2	3	4	5
1. Perceived job characteristics	.80	.59	.76	.48	.45
2. Extrinsic satisfaction	.55	.86	.71	.64	.67
3. Intrinsic satisfaction	.69	.75	.79	.53	.49
4. Organizational commitment	.45	.62	.52	.83	.65
5. Trust in management	.43	.64	.51	.64	.70

^a Results for time 1 are below the diagonal and results for time 2, above. Numbers of respondents range from 519 to 578 for different variables. Alpha coefficients, shown in boldface on the diagonal, are for time 1 data.

Outcomes of Autonomous Group Working

Table 2 presents the means for the various subgroups. The MANOVA for the shift process workers revealed no significant work design-by-time interaction and no effect for time. However, the effect of work design was significant ($p < .001$). Univariate F -tests ($df = 12,373$) showed that the semiautonomous and traditional populations differed significantly on intrinsic job characteristics ($F = 22.0$, $p < .001$), extrinsic satisfaction ($F = 11.8$, $p < .001$), intrinsic satisfaction ($F = 9.2$, $p < .001$), and organizational commitment ($F = 6.0$, $p < .01$), but not on trust in management ($F = 2.8$, $p > .05$).

The Helmert contrasts revealed that although the two autonomous groups did not differ significantly, their weighted pooled results did differ from those of the traditional group of shift process workers ($p < .001$). Univariate F -tests for the significant contrast showed the same pattern of results as was found for the saturated model. None of the Bartlett-Box homogeneity-of-variance F -tests were significant. However, Box's M multivariate test for the homogeneity of dispersion matrixes was significant ($p < .001$), and an examination of the determinants for these matrixes showed that they were correlated with group size.^{3,4}

The findings for perceived intrinsic job characteristics provided an important manipulation check. We obtained additional evidence from a comparison of scores on the work role autonomy measure from the two occupa-

³ Stevens (1986) argued that under such conditions, significance tests will tend to be conservative. For the time comparisons, the relation of the magnitude of the determinants and the group sizes differed between the levels of work design, which should have left the value of alpha relatively unaffected. The fact that some individuals contributed data at both time 1 and time 2 would also have contributed to the conservativeness of the tests.

⁴ We investigated the possibility that mortality accounted for some of the observed results by means of a MANOVA with length of service (less than or equal to one year and greater than one year) as the independent variable. This analysis revealed no significant differences at time 2 (Hotelling's $T^2 = 5.21_{5,83}$; $T^2 = 2.45_{5,83}$) (Norusis, 1985: 211). In addition, MANOVAs holding satisfaction with pay constant still gave rise to a significant work design effect for the shift process workers ($p < .001$).

TABLE 2
Perceived Job Content and Attitudes, Times 1 and 2^{a,b}

Variables	Shift Process Workers				Day Maintenance Workers			
	Established Site, Traditional Work Design		Established Site, Autonomous Group Working		Greenfield Site, Traditional Work Design		Established Site, Traditional Work Design	
	Time 1	Time 2	Time 1	Time 2	Time 1	Time 2	Time 1	Time 2
Perceived intrinsic job characteristics	26.8 (5.2)	27.2 (6.1)	33.4 (7.1)	33.3 (5.5)	31.8 (6.5)	29.2 (6.0)	29.7 (6.2)	29.8 (5.1)
Work role autonomy					37.2 (9.7)	37.9 (10.3)	32.5 (7.9)	31.4 (8.7)
Extrinsic satisfaction	33.9 (7.7)	34.6 (7.1)	39.6 (7.2)	39.3 (5.7)	37.9 (6.8)	37.2 (6.9)	32.2 (6.4)	33.6 (5.6)
Intrinsic satisfaction	28.6 (7.5)	26.1 (8.6)	33.8 (7.2)	34.2 (5.2)	31.1 (7.8)	28.6 (7.6)	26.9 (7.4)	27.3 (8.3)
Organizational commitment	41.9 (8.7)	41.9 (9.2)	50.0 (8.3)	45.4 (8.8)	45.7 (9.8)	42.9 (8.6)	37.1 (8.0)	38.1 (9.3)
Trust in management	24.2 (6.5)	24.6 (7.8)	29.2 (9.2)	23.7 (7.2)	27.0 (7.2)	25.3 (7.2)	19.6 (7.7)	23.7 (6.5)
							34.2 (7.2)	32.2 (6.8)
							30.2 (6.5)	27.5 (7.2)
							40.4 (8.6)	37.2 (8.9)
							20.7 (7.5)	20.7 (7.8)

^a Ns for times 1 and 2 were as follows: For shift process workers, established site, traditional work design, 130 and 89; established site, autonomous group working, 9 and 11; greenfield site, autonomous group working, 79 and 61. For day maintenance workers, greenfield site, traditional work design, 37 and 40, and established site, traditional work design, 74 and 54.

^b Values in parentheses are standard deviations.

tional groups at the greenfield site. As these work role responsibilities are relatively independent of the actual tasks being performed (e.g., allocating tasks, overtime, determining order of work, etc.), it is possible to compare process and maintenance work groups on this measure. A two-way ANOVA (work group by time, $df = 1,240$) indicated that the difference between the two groups was significant ($F = 19.44$, $p < .001$), in the direction of higher autonomy for those working in autonomous work groups, with no significant time or work group-by-time interaction effects.⁵

Results of the MANOVA involving the two maintenance groups showed no significant time effects or site-by-time interactions but did show the attitudes of the greenfield site maintenance employees to be less favorable than those of their counterparts at the traditional site ($p < .001$). Univariate F -tests ($df = 1,201$) indicated that this difference was in terms of trust in management ($F = 5.85$, $p < .05$).

Absenteeism data taken from the three shift process groups involved in the longitudinal analysis showed that absenteeism was higher for those in the autonomous condition at the greenfield site than for the two traditional site process worker groups, both in terms of percentage hours (6.2 vs. 4.6 and 4.7 percent) and frequency per person (4.4 vs. 3.2 and 3.7). Turnover was also higher for that group (11 vs. 6 and 7 percent). Turnover in shift process workers' positions was accounted for by internal promotions (30%) and promotional transfers to other sites (13.5%), with 56.5 percent leaving the firm altogether. Exit interviews conducted by personnel specialists suggested that the major influences on the employees deciding to leave the firm altogether were the distance they had to travel to work and the availability of work elsewhere. In the maintenance area, the proportion of employees receiving internal promotions was lower (5.5%); 22 percent received transfers to other sites and 72.5 percent left the company altogether. In this case, a significant number of maintenance employees indicated that their reasons for wishing to leave the firm were work related. Interviews with maintenance employees prior to their departures indicated that some were intending to quit because of the failure of management and the unions to arrive at an agreement on new work and skilling arrangements. The issue of pay relativity was often cited as a concern, especially the fact that a top-grade process operator could earn as much as a base-level tradesperson. Chance interviews with several former maintenance employees at another firm confirmed this issue as a major reason for the high percentage of leavers in the maintenance area.

⁵ The apparent decline in some measures over time within the autonomous population at both sites was also tested for significance using a more sensitive repeated-measures MANOVA. This test was possible because identifiers were used on the questionnaires at the greenfield site, and the small number of individuals in the traditional autonomous condition permitted the matching of questionnaires on biographical data. The results of this analysis showed that the only significant effect ($p < .05$) was for time on organizational commitment.

DISCUSSION

The results provide clear support for Hypothesis 1: employees in autonomous work groups reported more favorable work attitudes than those operating under traditional work structures. Though it appears that the autonomous work groups at both sites had a drop-off in their levels of organizational commitment, commitment still remained higher for these employees than for those operating under traditional work designs. In this respect, the findings differ from those of Wall and colleagues (1986).

The findings on absenteeism and turnover are also interesting. They confirm Wall and colleagues' findings yet run counter to conventional wisdom as to major benefits associated with autonomous group work. Hypothesis 2 was not supported, but at one level the findings are consistent with those of previous research on these two complex behaviors. Research on both absenteeism and turnover has suggested that the causes of both are potentially diverse and often outside the organizational sphere (Nicholson & Johns, 1985). Workers at the new plant, for example, had to travel a far greater distance to get to work than workers at the established plant. In addition, the present interview and personnel data help to point to at least one reason for higher absenteeism among the greenfield site employees. Those employees commonly reported that they were working high levels of overtime in the first year of the plant's operation, a fact confirmed by examination of overtime records. This fact might be expected to lead to greater absence, either through an income-compensation mechanism or through fatigue-induced illness. By contrast, at the established site overtime was strictly controlled and was at very low levels, reflecting the stability of the established plant's operations.

In terms of the overall organizational structure, the greenfield organization began life considerably "flatter" than its established counterpart and continued in that direction. After start-up, there were further reductions in managerial and clerical-administrative support positions (-12%) and in specialist technical and engineering support (-45%), and there were increases of 50 percent in the number of semiskilled day process workers and of 9 percent in day maintenance workers. Interestingly, the data showed no reduction in the number of first-line supervisors over time, though the increase in the numbers of process and maintenance workers obviously increased the supervisory span of control. The inherent supervisory demands of the work design were difficult to sort out from constraints provided by the particular structural arrangement that had been chosen to support it and the unusual demands associated with plant start-up. By starting flat and recruiting inexperienced shift process operators, the management hierarchy was under considerable pressure in terms of providing necessary team development and training as well as meeting the difficult operating requirements of a plant as it settled in. All employees worked very long hours in the first 18 months of the plant's operation, a factor that may have contributed to the levels of absenteeism observed.

The third hypothesis, relating to the maintenance employees' attitudes, found support in our results. Further, most maintenance workers we interviewed expressed considerable frustration at the lack of progress in negotiating a work design agreement to cover their area. Feelings of dissatisfaction at these unmet expectations grew during the course of the study and were increased by the observation that a fully multiskilled shift process worker at the top of the pay scale could now earn more than a base-grade tradesperson. Management was seen as largely responsible for not coming up with an acceptable agreement, and a significant number of maintenance workers left the company. Conflict also occurred between the two sets of employees. It is worthwhile noting that there were several instances of industrial stoppages (strikes and walkouts) in the course of this study, all initiated by maintenance workers, and all except one relating to the issue of demarcation between maintenance and process teams. Overall, however, monthly management reports indicated that the level of industrial disputation (measured in terms of frequency and hours lost) for all groups at this new site was still consistently below that seen at the traditional site.

Some comment needs to be made concerning the methodological shortcomings of the present design. We adequately coped with potential threats to internal validity—those posed by history, maturation, testing, instrumentation, statistical regression, mortality, compensatory rivalry, and resentful demoralization (Cook & Campbell, 1979)—either by the design or through supplementary analysis (the mortality analysis). Selection remained a potential risk. It is possible that employees in the two work design conditions would have responded in the manner observed regardless of the work design they operated under. Or they may have been selected for one or the other work design on the basis of their capacity to respond to that condition. In the case of the former argument, supplementary analyses in terms of length of service and the similarity in the production processes and general conditions of employment at the two sites render this explanation unlikely. The latter possibility is more problematic, since early interviews with managers indicated that they were keen to select new employees with little industry experience and a willingness to take on a reasonable level of self-regulation. In practice, however, an industrial agreement on transfers meant that managers at the new site were required to take a significant proportion of new staff members from sister plants, including the comparison site, without the opportunity to apply any special selection criteria to that work force. Second, specialist company recruiters indicated in interviews that they found it impossible to determine exactly what constituted a capacity for self-regulation among new applicants and in practice applied the same selection criteria used at other sites.

Gamma change (Golembiewski, 1986), a change in the meaning of a construct over time, must also be considered in accounting for these findings. This explanation is difficult to completely discount, given the lack of a full, factorial, repeated-measures design, though the finding that there were no significant differences between the views of newcomers and old

employees at time 2 (see footnote 4) lends some support to our view that this is an unlikely explanation for these findings.

Finally, this study could not address the issue of productivity within these groups directly. A number of practical reasons can be advanced for this lack. First, the established plant operated a multiple-unit processing facility, as opposed to the greenfield site's single unit. Multiple-unit operation offers significant performance advantages, since a plant may continue operating while one unit is closed for maintenance. Thus, performance figures in terms of output are not directly comparable across the two sites. Second, the continuous process technology operated at both plants does not lend itself to the identification of performance indicators that may be readily associated with the effort and discretion of a given group of employees. Nevertheless, the greenfield site managed to exceed its overall production targets in its first two years of operation and reduced labor costs through a reduction in managerial and support personnel. Furthermore, the organization has recently decided to add another processing unit to the plant, adopting the same basic approach to work organization already in use there.

CONCLUSIONS

This study confirms the positive influence of autonomous work groups on a range of member attitudes, thereby indicating the robustness of the underlying theoretical frameworks. Given powerful economic and technological forces driving organizations toward flatter, more flexible work structures (Gustavsen, 1986; Walton & Susman, 1987), evidence of this kind is encouraging. The maintenance group findings highlight the need to achieve congruence between all elements of an organizational design, and the absence and turnover data illustrate some of the pressures associated with starting up autonomous groups in a new site. Finally, it is clear that future research will need to more systematically address the issue of performance outcomes within autonomous groups in field settings, as well as the processes influencing employee performance and behavior within such groups.

REFERENCES

- Chems, A. B. 1976. The principles of sociotechnical design. *Human Relations*, 29: 783-792.
- Cook, T. D., & Campbell, D. T. 1979. *Quasi-experimentation: Design and analysis issues for field settings*. Chicago: Rand McNally.
- Cook, J., & Wall, T. D. 1980. New work attitude measures of trust, organizational commitment and personal need fulfillment. *Journal of Occupational Psychology*, 53: 39-52.
- Cummings, T. G. 1978. Self-regulating work groups: A socio-technical synthesis. *Academy of Management Review*, 3: 625-634.
- Emery, F. E. 1959. *Characteristics of sociotechnical systems*. London: Tavistock.
- Golembiewski, R. T. 1986. Contours in social change: Elemental graphics and a surrogate variable for gamma change. *Academy of Management Review*, 11: 550-566.
- Gulowsen, J. 1972. A measure of work group autonomy. In L. E. Davis & J. C. Taylor (Eds.), *Design of jobs*: 374-390. London: Penguin.

- Gustavsen, B. 1986. Evolving patterns of enterprise organization: The move towards greater flexibility. *International Labour Review*, 125: 367-382.
- Hackman, J. R. 1983. The design of work teams. In J. Lorsch (Ed.), *Handbook of organizational behavior*: 70-94. Englewood Cliffs, NJ: Prentice-Hall.
- Hackman, J. R., & Oldham, G. R. 1976. Motivation through the design of work: Test of a theory. *Organizational Behavior and Human Performance*, 15: 250-279.
- Herbst, P. G. 1974. *Socio-technical design*. London: Tavistock.
- Lawler, E. E. 1977. Adaptive experiments: An approach to organizational behavior research. *Academy of Management Review*, 2: 576-585.
- Nicholson, N., & Johns, G. 1985. The absence culture and the psychological contract: Who's in control of absence? *Academy of Management Review*, 10: 397-407.
- Norusis, M. J. 1985. *SPSS^x advanced statistics guide*. New York: McGraw-Hill.
- Pasmore, W. A. 1988. *Designing effective organizations: The sociotechnical systems perspective*. New York: Wiley.
- Pasmore, W. A., Francis, C., Haldeman, J., & Shani, A. 1982. Sociotechnical systems: A North American reflection on empirical studies of the seventies. *Human Relations*, 35: 1179-1204.
- Quinn, R. E., & Rohrbaugh, J. 1983. A spatial model of effectiveness criteria: Towards a competing values approach to organizational analysis. *Management Science*, 29: 363-367.
- Shaiken, H., Herzenberg, S., & Kuhn, S. 1986. The work process under more flexible production. *Industrial Relations*, 25: 167-183.
- SPSS Inc. 1988. *SPSS-X user's guide* (3rd ed.). Chicago: SPSS Inc.
- Stevens, J. 1986. *Applied multivariate statistics for the social sciences*. Hillsdale, NJ: Lawrence Erlbaum Associates.
- Wall, T. D., Kemp, N. J., Jackson, P. R., & Clegg, C. W. 1986. Outcomes of autonomous work groups: A long-term field experiment. *Academy of Management Journal*, 29: 280-304.
- Wall, T. D., & Martin, R. 1987. Job and work design. In C. L. Cooper & T. Robinson (Eds.), *International review of industrial and organizational psychology*: 61-92. Chichester, England: Wiley.
- Walton, R. E., & Susman, G. I. 1987. People policies for the new machines. *Harvard Business Review*, 65(2): 98-106.
- Warr, P. B., Cook, J., & Wall, T. D. 1979. Scales for the measurement of some work attitudes and aspects of psychological well-being. *Journal of Occupational Psychology*, 52: 129-148.

John Cordery obtained his Ph.D. degree from the University of Sheffield and is currently a senior lecturer in the School of Management at Curtin University of Technology, Western Australia. His research interests are in the areas of enterprise-based skills formation, work design, and first-level supervision.

Wally Mueller gained his Ph.D. degree from the University of Western Australia. He is associate professor of psychology and Co-Director of the Centre for Applied Psychology at Curtin University. Current research interests include the management of flexible labor market programs and the organizational impact of new technology.

Leigh Smith gained his M.Sc. degree from the University of Western Australia and is a lecturer in the School of Psychology at Curtin University. Current research interests are primarily in the areas of methodology and data analysis, unemployment research, and drinking behavior.

INSEAD
Fontainebleau, France
CALL FOR NOMINATIONS
for the
SANDOZ CHAIR IN MANAGEMENT AND
THE ENVIRONMENT

INSEAD is seeking nominations for the newly established Sandoz Chair in Management and the Environment. Nominees should be distinguished academics with strong research records. They should be able to contribute to INSEAD's growing reputation in this field not only by their own continuing work but as catalysts to stimulate the research and interest of others on the Institute's faculty. Nominations are sought from a variety of disciplines (e.g., economics, environmental science, public policy analysis, organizational behaviour, law, etc.). Applicants should have an international perspective and a keen interest in the managerial relevance of their work.

INSEAD is one of Europe's leading business schools. Its main characteristics are an international outlook, close links with the business community, and a belief in the synergy between research and teaching. Convinced that the roots of excellence in its teaching programmes reside in a base of solid research, the Institute has embarked on an effort to underwrite its research activities with the endowment of a number of chairs, of which the Sandoz Chair in Management and the Environment is the latest. The chair is the result of the school's early recognition of the environment as a crucial issue for the international business community and thus a priority for management education. The Institute is most grateful to Sandoz for recognizing its efforts in this way.

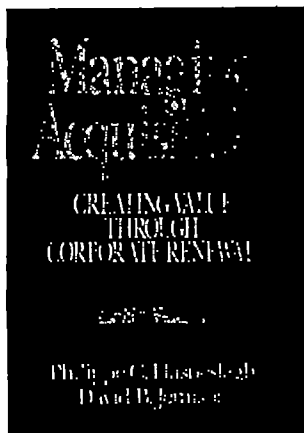
The school's 80 full-time faculty members (representing 24 nationalities) and the 450 MBAs and 2,500 executives attending the school annually from around the world provide an exciting international atmosphere that is ideal for exchanging and testing ideas and for establishing contacts for applied research.

INSEAD is located 60 km south of Paris. The working language is English. Educational programmes exist at the MBA, executive, and PhD levels.

Nominations and applications should include a curriculum vitae and three references. Nominations or requests for further information should be addressed to:

Prof. H. Landis Gabel
Chairman of the Sandoz Chair Search Committee
INSEAD
Boulevard de Constance
77305 Fontainebleau Cedex
France
Fax: 33.1.6072.4242
Bitnet: "Gabel@FREIBA51"

The Leaders.



MANAGING ACQUISITIONS Creating Value Through Corporate Renewal

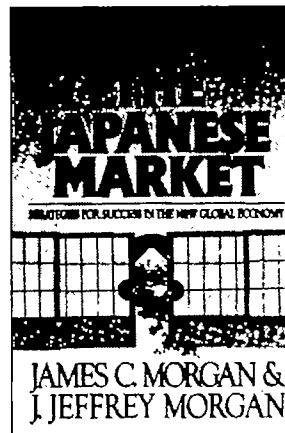
Philippe C. Haspeslagh, *INSEAD*,
and David B. Jemison,
University of Texas, Austin

Based on eight years of research at 20 companies in the United States, Europe, and Japan, Haspeslagh and Jemison argue that conventional views of corporate acquisitions focus on pre-acquisition strategic fit which address only the *potential* for value creation. Real value, they show is created only *after* the acquisition, and with managerial actions not financial engineering. They provide a close look at the ways experienced acquirers are coping with acquisition decisions—and tell a tale of strategic vision, leadership, and a commitment to making organizations more capable of learning and change.

“Haspeslagh and Jemison focus on the strategic rationale and implementation challenges in acquisitions and not financial engineering. *Managing Acquisitions* provides a thorough treatment of the acquisition process and points out the key elements that affect strategic renewal and value creation.”

—Vernon R. Loucks, Jr., Chairman and
CEO, Baxter International Inc.

1991 0-02-914165-6 \$29.95



CRACKING THE JAPANESE MARKET Strategies for Success in the New Global Economy

James C. Morgan,
Applied Materials, Inc., and
J. Jeffrey Morgan, *RAD Technologies*

In this brilliant examination of Japanese markets, companies, and business practices, the authors provide valuable insights into the specific problems facing Western companies in establishing a direct presence in Japan: in financing the venture, product design and production, marketing and distribution, and most important, establishing long-term partnerships.

“Brilliant! Practical! Provides no ‘instant success secrets.’ It does provide a singular, thoughtful analysis and case study of how Americans can win in Japan. Opportunities abound for the persistent and wise. Read this book and forget the old excuses about ‘impossible’ Japan: They don’t wash!”

—Tom Peters,
author of *Thriving on Chaos*

“A telling examination of what it really takes to compete and win against the Japanese in Japan. It is full of practical advice and strategies almost any company can use.”

—Robert Galvin, Chairman of the
Executive Committee, Motorola Inc.

1991 0-02-921691-5 \$24.95

COGNITION AND RATIONALITY IN NEGOTIATION

Margaret A. Neale and
Max H. Bazerman,
both *Northwestern University*

Building upon the landmark work of Howard Raiffa on interdisciplinary interaction in negotiation and the groundbreaking research of Daniel Kahneman and Amos Tversky on how cognitive biases affect judgment, Neale and Bazerman examine the role of rationality as well as other variables that affect the negotiation process. The resulting "behavior decision theory" offers more predictive power to management sciences in negotiation and a more useful description of effective human decision behavior.

“A unique source of information. Neale and Bazerman construct a bold new theory of negotiation in the best synthesis of recent research in the field. It will be indispensable to managers and students of negotiation.”

—Gregory B. Northcraft, *University of Arizona*

1991 0-02-922515-9 \$40.00

COMMITMENT The Dynamic of Strategy

Pankaj Ghemawat,
Harvard Business School

"Commitment"—the tendency of managers to persist with business strategies over time—is the central dynamic that determines how one company's long-term performance differs from another, argues Ghemawat in this brilliant reassessment of the theory of how companies sustain competitive advantage.

“Large, irreversible investments are the place where strategy must confront reality. Ghemawat's book is brimming with interesting and important ideas about how such commitments should be made.”

—Michael E. Porter, *Harvard Business School*

June 1991 0-02-911575-2 \$29.95

THE NEW TELECOMMUNICATIONS Infrastructure for the Coming Intelligent Network

Frederick Williams,
University of Texas, Austin

Telecommunications has moved from a simple support role to an essential infrastructure, Williams argues, and he reveals how telecommunications can support new patterns of business decentralization, community development, and revitalization of the rural economy. In this new book, he foresees the increasing coalescence of computing and telecommunications into "coming intelligent network" able to combine traditional and new services on a common high performance network. He proposes that telephone companies take the lead, especially the "Baby Bells," and not only promote telecommunications as strategic investment, but redefine, based on market forces and expanding technology, what basic service will be.

July 1991 0-02-935281-9 \$35.00

RETHINKING BUSINESS-TO- BUSINESS MARKETING

Paul Sherlock, *Raychem Corporation*

“This is a practical, profound, and powerful book. Its breadth is stunning... Sherlock breaks new ground (marketing, selling, middleman relationships, product development, organization) and snickers at conventional wisdom. It is at once wildly challenging, deadly serious, and absurdly fun.”

—from the Foreword by Tom Peters,
author of *Thriving on Chaos*

1991 0-02-928615-8 \$19.95

**For Visa, MasterCard, or
American Express orders,
call toll-free 1-800-323-7445**

**Monday through Friday
between 8am-5:30pm Eastern time.**



THE FREE PRESS

A Division of Macmillan Inc., 866 Third Avenue, New York, NY 10022

THE BEST IN THE BUSINESS.

**NANYANG TECHNOLOGICAL UNIVERSITY**

(To be established on 1 July 1991)

SCHOOL OF ACCOUNTANCY AND BUSINESS
SINGAPORE**Shaw Foundation Chair**

In 1985, the Shaw Foundation made a donation for the purpose of setting up the Shaw Foundation Chair. The School is actively seeking qualified candidates to fill this prestigious appointment.

The School offers both undergraduate and graduate courses in Accountancy and Business. It currently has a student enrolment of about 4000.

Interested candidates specializing in any field of accountancy and business are invited to apply. Successful candidates are expected to be those who have made significant academic and research contributions in their respective fields. The appointment is preferable for a period of at least one year, although a shorter term may be negotiated.

The objective for the Shaw Foundation Professorship is to help create an academic environment that is conducive to learning and research. The successful candidate is expected to teach in the School's programs, undertake joint research projects with faculty, serve as a resource person to faculty research projects, assist in the development and review of the undergraduate and postgraduate curricula and provide advice on faculty development. At the same time, to enable the School of Accountancy and Business to forge strong links with the profession and industry, the appointee is expected to conduct some public lectures and to undertake visits to business enterprises.

The salary remuneration for the Shaw Foundation Professor will range from S\$102,000 to S\$162,000 (US\$1.00 = S\$1.75 approximately). Passage assistance, subsidised housing and medical benefits will be provided. Upon completion of the entire contract of service, he will receive a gratuity which is based on 25% of his last drawn gross monthly salary for every completed month of service.

Interested applicants should write to: DIRECTOR OF PERSONNEL, NANYANG TECHNOLOGICAL UNIVERSITY, NANYANG AVENUE, SINGAPORE 2263. FAX: (65) 261 2340

CORRECTION

In Greenwood, Hinings, and Brown (*Academy of Management Journal*, 33: 731), footnote d of Table 2 incorrectly states that "revenues are expressed in millions of dollars." It should be "... expressed in thousands of dollars."